The risk of alcohol
What general practice can do

Here's what the Encyclopaedia Galactica *has to say about alcohol. It says that alcohol is a colourless volatile liquid formed by the fermentation of sugars and also notes its intoxicating effects on certain carbon-based life forms.*
The Hitch Hikers Guide to the Galaxy *also mentions alcohol. It says that the best drink in existence is the Pan Galactic Gargle Blaster.*
It says that the effect of drinking a Pan Galactic Gargle Blaster is like having your brain smashed out with a slice of lemon wrapped around a large gold brick.
The Guide *also tells you on which planets the best Pan Galactic Gargle Blasters are mixed, how much you can expect to pay for one and what voluntary organizations exist to help you rehabilitate.*
Zaphod Beeblebrox, the man who invented this mind pummelling drink, also invented the wisest remark ever made, which was this: "Never drink more than two Pan Galactic Gargle Blasters unless you are a thirty ton mega-elephant with bronchial pneumonia."

From the BBC TV Series *The Hitch Hikers Guide to the Galaxy*, 1981

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What general practice can do

Intemperance is the physician's provider

Publilius Syrus, 45BC

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The risk of alcohol
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een wetenschappelijke proeve op het gebied van de Medische Wetenschappen

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CONTENTS

CHAPTER 1

INTRODUCTION

SUMMARY

Evolutionary study would suggest that human ancestors were exposed to low levels of dietary alcohol through eating fruit, a source of fermented alcohol and a major component of the diet. Early societies produced alcohol from a variety of different substances that were locally available. Global trade and economic factors largely determined drinking patterns. In modern day society, 49% of the total adult population uses alcohol, with a large proportion of the alcohol consumed by a small proportion of the consumers. Alcohol brings both pleasure and pain, with much of the pleasure based on expectancies. The pains are widespread; 25% of European men and 10% of European women consume alcohol at levels hazardous and harmful to their health; 10%-30% of drinking occasions include consumption of at least 60g of alcohol; and 3% to 5% of adult European and North American populations are dependent on alcohol. Overall, alcohol use disorders contributed to 4% of the total disease burden in the world in the year 2000. Prior to the 19th century, responses to intoxication or the harmful use of alcohol were concerned with moral attitudes and social behaviours regarded as sinful or criminal. The public health response to alcohol arose out of the temperance movements of the 19th and early 20th centuries. Present day alcohol policies focus on price measures, such as taxation; on non-price measures, such as controls on the availability of alcohol; and on the management of alcohol use disorders, all of which are effective in reducing a wide range of alcohol-related harm. Within the health care sector, general practice has been charged with the role of implementing screening and intervention programmes to reduce the risk of alcohol. However, general practitioners find the management of alcohol use disorders difficult at both a professional and an emotional level; this may be due to the many contradictions that are found in the use of alcohol. In order to help address the difficulty that general practitioners have in the management of alcohol use disorders, this thesis explores four topics: the risk that results from the use of alcohol; what general practice can do to reduce that risk; the attitudes of general practitioners that influence their work; and how the involvement of general practice in reducing the risk of alcohol can best be increased.

THE CONTRADICTIONS OF ALCOHOL

The use of alcohol brings with it not inconsiderable risk. General practitioners can reduce this risk, but they find it difficult to do so. A possible reason for this difficulty is that alcohol brings with it many contradictions. Whereas many people drink, others do not. Alcohol brings pleasure as well as pain. Alcohol has been described as a moral issue as well as a health issue. Alcohol is big business, making political choices for health sometimes difficult.

In this chapter, some of these contradictions will be described, first beginning with an evolutionary and historical description of the use of alcohol. The current use of alcohol and the pleasures and pains it can bring will be summarized. The responses to alcohol related harm will be considered, historically as a moral issue, and then more recently as a public health issue. The structure of the thesis will be outlined, describing how each chapter can contribute to an increased understanding of the risk of alcohol and what general practice can do to reduce that risk.

THE USE OF ALCOHOL

Alcohol and the human diet

It may be asked why such a toxic substance as alcohol seems to have been so commonly used since pre-recorded history (Thom 2001) and why humans have the ability to catabolize it (Agarwal & Goedde 1989; Agarwal & Goedde 1990; Goedde & Agarwal 1989). Alcohol occurs naturally in fermenting fruit (Dudley 2002), and it is likely throughout evolution that human ancestors were exposed to low levels of dietary alcohol through eating fruit, a major component of the natural diet prior to crop domestication (Johns 1990; Johns 1999; Dudley 2000), which occurred only about ten thousand years ago (Diamond 1999). Even today, fruits and carbohydrates generally remain the major dietary component of hunter-gatherer societies (see Anderson 1983; Eaton *et al.* 1997; Milton 1999). Low-level but chronic exposure to naturally occurring toxic compounds can follow a nutrient-toxin continuum, whereby low concentrations or exposures are stimulatory and beneficial, but higher concentrations are stressful and cause harm (see Calabrese & Baldwin 1998; Gerber *et al.* 1999), a phenomenon, termed hormesis, that may have been retained in present day people. The evolutionary interpretation of hormesis relies on the assumption that organisms evolve the necessary metabolic machinery to maximize the benefits and to minimize the costs of exposure to toxic substances that occur at low concentration (Gerber *et al.* 1999). One legacy of a fruit-eating diet is a well-developed ability to catabolize alcohol by alcohol dehydrogenase (ADH) in the liver, and the subsequent degradation of the ensuing aldehyde product via acetaldehyde dehydrogenase (Agarwal & Goedde 1990). Potentially positive behaviours associated with the natural occurrence of dietary alcohol may have included the use of its smell to find ripe fruit, its use as an appetitive stimulant to facilitate rapid consumption of transient nutritional resources, and its caloric benefits. It may be that the hormetic consequences of alcohol currently manifest themselves in the reduction in risk of coronary heart disease that is seen at low levels of alcohol consumption relative either to abstinence or to higher levels of intake.

Early societies and the use of alcohol

Early societies produced alcohol from a variety of different substances that were locally available (Charrington 1925), including grain, honey (Sournia 1990) and the grapevine, which was actively cultivated (Keller 1979). Already by the beginning of the second century BC, wine played an important economic role in the Italian home market and it became a valuable trade commodity and a major source of wealth (Jellinek 1976),

spreading throughout Europe following the Roman conquests. Wine was brought to England by the Romans, but when they left, subsequent invaders, the Angles, Saxons, Jutes and Vikings favoured ale and cider and the wine trade diminished. In many countries the traditional use of alcoholic beverages changed dramatically during European colonization. The introduction of alcohol, a consumable trading commodity, to people who hitherto had not known it, and of distilled spirits to societies accustomed to beverages with a lower concentration of alcohol, often disrupted traditional patterns of alcohol production and consumption and resulted in harmful drinking practices which were, nevertheless, financially beneficial to the European societies (Hall 1986; Tannahill 1988; Sournia 1990).

Whilst international trade shaped the history of alcohol production and use, what people drank also depended on the social organization and internal economies of the societies in which they lived (Tanahill 1988). In countries such as England and Germany, wine remained the drink of the aristocracy and the wealthy classes while most people drank ale, mead, or whatever was cheapest and most easily produced (Vogt 1984). Economic factors underpinned the "gin epidemic" in eighteenth century England, when consumption rose from 2.5 million litres in 1700 to over 25 million in 1735 (Warner 2002). The rise followed government action to help farmers find a market for excess grain and to destroy the trade in smuggled French brandy. By cancelling the tax on distillation, abolishing the control of manufacturing standards and permitting gin to be sold without a license, the floodgates were opened to the production of cheap gin, which quickly resulted in the excesses and public problems illustrated in Hogarth's famous depiction of "Gin Lane", reproduced on the cover of this book.

Modern day society and the use of alcohol

In modern day society trade in alcohol is still big business. The beverage alcohol industry's combined wealth (US$200 billion) exceeds the gross national product (GNP) of most non-industrialized countries (Jernigan 1997) and its total advertising expenditures exceeded US$4.5 billion in the year 2000 (Jernigan 2002). Probably this same sum is spent again on forms of promotion other than direct advertising. Nevertheless, throughout the world, less than one half (49%) of the total adult population uses alcohol (Rehm *et al.* 2001a; Room *et al.* 2002; World Health Organization 2002a; Rehm *et al.* in press). The proportion of users varies from 18% to 90% of adult males, and from 1% to 81% of adult females (Table 1.1). Since the 1970s, adult per capita consumption has been declining in western European countries and North America, but increasing in the Western Pacific and South-east Asia (Rehm *et al.* 2001a; World Health Organization 2002a; Rehm *et al.* in press), the target group of the alcohol industry (Grant 1978).

The use of alcohol is unevenly distributed throughout the population (Skog 1991); most of the alcohol in a society is drunk by a relatively small minority of drinkers. Lemmens (2001) estimated that the top one-tenth of drinkers in the Netherlands in the mid-1980s consumed more than one-third of the total alcohol, and that the top 30% of the drinkers accounted for up to three-quarters of all consumption. Greenfield and Rogers (1999) found even more extreme results in the United States. The top 20% drank almost 90% of all alcohol and young adults (ages 18-29 years),

comprising roughly one-quarter of the adult population, accounted for almost half of all adult consumption. Even in China, it has been estimated that the top 12.5% of the drinkers consume 60% of the total amount of alcohol (Wei *et al.* 1999).

Table 1.1 Characteristics of alcohol consumption in different regions of the world, late 1990s (population weighted averages).

WHO Region	Predominant Beverage type	Total consump-tion[1]	% drinkers among males[2]	% drinkers among females[3]	Consump-tion per drinker[4]
North and Central Africa	Mainly fermented beverages	4.9	47	27	13.3
Southern Africa	Mainly fermented beverages and beer	7.1	55	30	16.6
North America	Beer, followed by spirits	9.3	73	58	14.3
Latin America	Beer, followed by spirits	9.0	75	53	14.1
South America	Spirits, followed by beer	5.1	74	60	7.6
Middle East	Spirits and beer	1.3	18	4	11.0
Western Asia	Spirits and beer	0.6	17	1	6.0
Western Europe	Wine and beer	12.9	90	81	15.1
Central Europe	Spirits	9.3	77	57	14.3
Caucasus and Central Asia	Spirits and wine	4.3	54	33	9.9
Former Soviet Union	Spirits	13.9	89	81	16.5
South-East Asia	Spirits	3.1	35	9	13.7
Indian sub-continent	Spirits	2.0	26	4	12.9
Australasia and Japan	Beer and spirits	8.5	87	77	10.4
Western Pacific, including China	Spirits	5.0	84	30	8.8

1 Estimated alcohol consumption per resident aged 15 and older, including recorded and unrecorded consumption, litres of absolute alcohol per year.
2 Estimated proportion of male drinkers aged 15 and older.
3 Estimated proportion of female drinkers aged 15 and older.
4 Estimated alcohol consumption per drinker aged 15 and older, litres of absolute alcohol per year.
Sources: Rehm *et al.* (2001a); Rehm & Eschmann (2002); Rehm *et al.* (in press)

When alcohol consumption levels increase in any given society, there tends to be an increase in the prevalence of heavy drinkers, defined in terms of a high annual alcohol intake. For example, in Finland, following liberalization of the availability of alcohol, total alcohol consumption increased by 46% from 1968 to 1969. The increase in consumption was influenced more by the addition of new heavy drinking occasions than by new drinkers (Mäkelä 1970), and the increase was greater in heavier consumption groups (Mäkelä 2002). Because heavy drinkers account for a significant proportion of total alcohol consumption, it would be difficult for the total consumption level to increase without an increase in their drinking.

ALCOHOL AS A SOURCE OF PLEASURE

The use of alcohol brings with it a number of pleasures, a point emphasized by the beverage alcohol industry (Peele & Grant 1999). The notion that light consumption of alcohol is good in various ways for health is possibly as old as the history of alcohol itself (Thom 2001) and is embedded in folk wisdom on the subject (Charrington 1925). Alcohol has been medically recommended for pain and stress relief and for a variety of minor ailments. The perceived health benefits have received much support with the findings that small amounts of alcohol consumption can reduce the risk of coronary heart disease.

That alcohol improves the drinker's mood in the short term is perhaps the main reason why most people drink. There is, indeed, a large amount of experimental evidence that the acute effects of alcohol include increased enjoyment, euphoria, happiness and the general expression of positive moods, feelings that are experienced more strongly in group situations than when drinking alone (Pliner & Cappell 1974), and very much influenced by expectancies (Brown *et al*. 1980; Hull *et al*. 1983). Alcohol is an anxiolytic drug reducing anxiety and the physiological response to stress (Baum-Baicker 1987), as well as possibly self-awareness (Hull & Bond 1986).

Alcohol plays a role in everyday social life, marking such events as births, weddings and deaths, as well as marking the transition from work to play and easing social intercourse. Throughout history and in many different cultures, alcohol is a principal means by which many groups of friends enhance the enjoyment of each other's company and generally have fun (Heath 1995). So entrenched are these beliefs about alcohol that people become observably more sociable when they merely think that they have consumed alcohol but actually have not (Darkes & Goldman 1993).

Alcohol is drunk primarily for its intoxicating effects, even by those who are light or moderate consumers of wine. Many drinkers, and in particular younger men, deliberately and self-consciously use alcohol to pursue intoxication, i.e. to get drunk. As Heather (2001) has pointed out, the benefits of moderate drinking occur in spite of, not because of, the basic nature of the substance. This may have its origins in biological survival ability and reproductive fitness in human's ancestral environments, which is interpreted by modern humans in their use of alcohol as an internalized and potentially faulty self-perception, rather then biological fitness (Gerald & Higley 2002; Hill & Chow 2002; Newlin 2002).

ALCOHOL AS A SOURCE OF PAIN

The pain from alcohol arises from it being a toxic substance (harmful use), an intoxicating substance and a dependence producing substance.

Alcohol is ***a toxic substance*** in terms of its direct and indirect effects on a wide range of body organs and systems (Gutjahr *et al.* 2001; Rehm *et al.* in press). The use of alcohol that leads to toxic effects is very widespread. At any one time in western European populations, some 25% of men and 10% of women are consuming alcohol at levels hazardous and harmful to health (Rehn *et al.* 2001).

Alcohol intoxication can be defined as a more or less short-term state of functional impairment in psychological and psychomotor performance induced by the presence of alcohol in the body. The impairments that can be produced by alcohol are mostly dose-related, often complex and involve multiple body functions. The prevalence of serious intoxication occasions is very widespread, with, across European countries and North America, some 10%-30% of drinking occasions including consumption of at least 60g of alcohol (6 drinks).

Alcohol dependence, first conceptualized as a syndrome by Edwards and Gross (1976), and with a strong biological basis (Roberts & Koob 1997), is a recognized disorder within the ICD classification of mental and behavioural disorders (World Health Organization 1992). The prevalence of alcohol dependence ranges from 3% to 5% in European and North American countries (World Health Organization 2002a). No matter how drinking is measured (Grant & Harford 1990; Muthen *et al.* 1992; Dawson & Archer 1993; Hall *et al.* 1993; Caetano & Tam 1995; Midanik *et al.* 1996; Caetano *et al.* 1997), the risk of alcohol dependence begins at low levels of drinking and increases linearly with both the volume of alcohol consumption and a pattern of drinking larger amounts on an occasion (Caetano *et al.* 1997; Caetano & Cunradi 2002).

Whereas alcohol use disorders (the toxic effects of alcohol, alcohol intoxication and alcohol dependence) contributed to 3.5% of the global burden of disease in 1990 (Murray & Lopez 1996; World Health Organization 1999), the proportion had increased to 4% in the year 2000, and to at least 9% in European countries (World Health Organization 2002b). Overall, injuries account for the largest portion of disease burden, with 40% in total, and with unintentional injuries by far outweighing intentional injuries, Table 1.2 (Rehm *et al.* in press). The second largest category is alcohol-attributable neuropsychiatric diseases and disorders with 38%. Other alcohol-attributable non-communicable diseases (diabetes and liver cirrhosis), malignant neoplasms and cardiovascular disease each contribute 7% to 8% of the total. These are net figures, for which the alcohol-related beneficial effects on disease have already been subtracted. They do not include the social costs of alcohol (Gutjahr & Gmel 2001). Overall, the detrimental effects of alcohol on disease burden by far outweigh any beneficial effects.

THE POLICY RESPONSE TO ALCOHOL

Alcohol as a moral issue

Prior to the nineteenth century, responses to intoxication or the harmful use of alcohol were concerned with moral attitudes and social behaviours regarded as licentious, sinful or criminal (Porter 1985; Porter 1990; Thom 1999). In England, for example, licensing grew out of concern with public houses as unruly hotbeds of political dissent, and in 1495, an act was passed by which alehouses could be suppressed on the agreement of two justices of the peace. It was re-enacted in 1503, stating: “Forasmuch as intolerable hurts and troubles to the Commonwealth of this Realm doth daily grow and increase through such abuses and disorders as are had and used in common alehouses, . . . ” (Wilson 1940, p. 95).

Table 1.2 Global burden of disease (DALYs[1] in 1000's) attributable to alcohol by major disease categories for year 2000.

Disease conditions	DALYs	%
Cancers**: Head and neck cancers, cancers of the gastrointestinal tract including liver cancer, female breast cancer**	4,201	7.2%
Neuropsychiatric conditions**: alcohol dependence syndrome, depression, anxiety disorder, organic brain disease**	21,904	37.7%
Cardiovascular conditions**: ischaemic heart disease, cerebrovascular disease**	3,983	6.9%
Gastrointestinal conditions**: alcoholic liver cirrhosis, cholelithiasis, pancreatitis**	4,555	7.8%
Maternal and perinatal conditions**: low birth weight, intrauterine growth retardation**	123	0.2%
Accidents and unintentional injuries**: road and other transport injuries, falls, drowning and burning injuries, occupational and machine injuries, alcohol poisoning**	15,767	27.2%
Intentional and self-inflicted injuries**: suicide and assaults**	7,514	12.9%
Alcohol-related disease burden all causes (DALYs)	58,047	100.0%

[1]Disability Adjusted Life Years (DALYs), a methodology introduced in the Global Burden of Disease, accounts for the disability and chronicity caused by disorders (Murray & Lopez 1996). The DALY is a measure of health gap, which combines information on disability and other non-fatal health outcomes and premature death. One DALY is one lost year of 'healthy life'.
Source: Gutjahr *et al.* (2001); Rehm *et al.* (2001b); World Health Organization (2002a); Rehm *et al.* (in press).

Drunken behaviours that were perceived as subversive of the social and moral order in medieval times included playing the fool, refusal to defer to social superiors, the local minister and the church among others, and conspicuous consumption of certain kinds of food and drink by the lower classes (Warner 1997). Charges for disorderly conduct recorded between 1560 and 1640 included wives brawling with husbands and neighbours, parents who allowed children to run around the church during services, parishioners who sat in pews reserved for their social superiors, and other similar offences.

That these responses were not confined to medieval times is illustrated by the testimony of a witness to the Select Committee in 1833 on the harm resulting from the 1830 Beer house Act, by which any householder could sell beer, free from licensing or control by the justices. Among the many excesses and problems created by the proliferation of outlets was that: "The Act has increased the opportunities of meeting of

the lower classes to discuss politics and what they call their own grievances, and thus done more harm than good" (Wilson 1940, p. 102).

The growth of a public health response

During the early part of the nineteenth century, the modern conception of alcohol addiction took place (Levine 1978), including the idea of gradual and progressive addiction, bouts of drunkenness characterized by an inability to refrain from alcohol (loss of control), the description of the condition as a 'disease' and total abstinence as the cure. Conceptualization of the harmful use of alcohol as a disease led to treatment as being the appropriate form of response and, over the course of the nineteenth century, in Europe and North America, a variety of treatments were offered by private doctors and voluntary and philanthropic societies (Baumhol & Room 1987). The approach was to change professional and public images of the 'habitual drunk' or 'alcoholic' from 'a hopeless case', a 'morally weak person', to an unfortunate individual afflicted by a disease which, like other diseases, was amenable to cure through medical and psychiatric care and appropriate lay support.

While medical understanding was important in formulating a treatment approach, wider dissemination of the ideas to the general public and the mobilization of policy change owed much to the temperance movements of the 19th century (Street *et al*. 1862; Bretherton 1991) which, to begin with, were not prohibitionist (temperance meaning moderation, not abstinence). The temperance strategy drew its success on its grass roots appeal and its relevance to the concerns and ambitions of ordinary working and middle class people, including an increased chance of education and participation in public and political life (Tyrrell 1991), as well as class struggles (Bretherton 1991).

With time, pressure transformed the temperance messages into ones of abstinence, leading eventually to prohibition in North America (Levine 1985). Prohibition proved to be unsuccessful in America, not because it failed to lower consumption, but because it proved impossible to implement and police, leading to lawlessness (Levine 1985).

The influence of temperance thinking was a dominant force on late nineteenth and early twentieth century legislation in the Nordic countries. The result was total prohibition for a time in some countries (Finland 1919-1932) or in some regions (municipalities in Norway around 1914). In Sweden, despite strong political influence at the beginning of the century, temperance pressure for total prohibition was rejected. However, strict controls were enforced through the Gothenburg system, in which municipalities set up special non-profit companies to control distribution and sale of alcohol, followed by a rationing system, whereby alcohol rations were allocated to Swedish citizens according to age, sex, occupation and family circumstances. Most of these laws were repealed during the 1920's and 1930's, replaced by less extreme regulatory policies. Total alcohol prohibition still remains a crucial part of some government policies, mostly in Islamic countries and states of India, and it emerged as late as 1978 in the Pacific Islands as a way of tackling public drunkenness and violence (Marshall & Marshall 1990).

During the second half of the twentieth century, the focus of concern became the harm done by alcohol, rather than 'alcoholism'; and the extent of alcohol-related harm

in communities and populations as a whole, rather than just in the individual and the family (Berridge 1989). The public health approach proposed that both changes in the individual use of alcohol and public health measures were required to reduce the harm done by alcohol (Baggot 1990; Kemm *et al*. 1991).

Present day alcohol policies are those that focus on price measures, such as taxation, and non-price measures, such as controls on availability, and the management of alcohol use disorders (Bruun *et al*. 1975; Edwards *et al*. 1995; Heather *et al*. 2001). All of these measures are effective in reducing a wide range of harm such as liver cirrhosis, motor vehicle fatalities, homicides and crimes in both heavier and lighter drinkers.

Whilst the management of alcohol problems has clear benefit at the level of the individual, there is also evidence for its impact at the level of the population (Smart & Mann 1993; Smart and Mann 2000). Declining liver cirrhosis rates have been associated with the increased treatment for alcohol problems in Ontario, Canada (Mann *et al.* 1988), Sweden (Romelsjo 1987) and North Carolina (Holder & Parker 1992). A relationship has also been found over time between membership of Alcoholics Anonymous (AA) and alcohol-related problems, including cirrhosis rates (Smart *et al.* 1989; Smart & Mann 1990; Mann *et al.* 1991; Smart & Mann 1991), such that a 1% increase in AA membership is associated with a 0.06% decrease in cirrhosis mortality.

Broadening the base of treatment

The treatment of alcohol use disorders is one element of alcohol policy and a public health response to reduce the harm done by alcohol. Treatment systems (Heather 1995; Humphreys & Tucker 2002) for alcohol use disorders need to go beyond those that currently serve highly dependent drinkers (Porter *et al.* 1999). In particular, it has been proposed that interventions aimed at drinkers with mild to moderate problems should be disseminated more broadly (Institute of Medicine 1990). Although there has been an increasing emphasis on the role of primary health care in the prevention and management of alcohol use disorders (Anderson 1996; Babor & Higgins-Biddle 2000), general practitioners find the integration of such interventions into routine clinical practice difficult (Heather 1996; Deehan *et al*. 1998). Among the reasons most often cited are the perceived incompatibility of managing alcohol problems in primary health care (it is not a health issue to be managed in primary health care); the belief that alcohol use disorders do not respond to interventions (there is not enough evidence for effectiveness); lack of therapeutic commitment and fear of antagonizing patients over a sensitive personal issue (the attitudes of the general practitioners impede their work); and there is inadequate training and support (it is not known how best to engage general practitioners in the management of alcohol use disorders) (Babor & Higgins-Biddle 2001).

QUESTIONS TO BE ANSWERED BY THE THESIS

Alcohol is a subject that touches many areas of public and private life, and is an object of discourse in many different disciplines; including studies in evolution, history,

anthropology, economics, psychology and sociology, as well as in the biological and health sciences (see Heather *et al.* 2001). The perspective taken in this thesis is public health, the science and art of preventing disease, prolonging life and promoting health through organized efforts of society (Acheson 1988). Within this perspective, and recognizing the difficulties general practitioners have in reducing the risk of alcohol, this thesis addresses four main research questions: 1) what is the risk of alcohol for health; 2) can brief interventions given in general practice reduce the risk of alcohol; 3) what are the attitudes of general practitioners to reducing the risk of alcohol; and 4) how can the involvement of general practice in reducing the risk of alcohol best be increased.

The thesis focuses on the perspective of the provider, rather than the consumer. In so doing, however, it should be recognized that clients' perceptions of available treatment programmes, their own everyday experiences with alcohol and their concerns about alcohol and health are crucial factors that determine whether or not expert advice is sought (Klingemann 2001). Client characteristics are also very important determinants of the extent to which, and the type of patients with whom, general practitioners intervene for alcohol-related problems (Kaner *et al.* 2001).

STRUCTURE OF THE THESIS

Answers to the research questions will considered in four parts.

Part I The risk of alcohol

Although the relationship between alcohol consumption and a wide range of harm had been long known, little had been published at the beginning of the 1990s about the nature and shape of the curves that describe the risk relationships between alcohol consumption and harm. Chapter 2 will report on a review of 156 published papers that examined the risk of physical harm in relation to alcohol consumption. The review, which presents a number of risk function curves on the relationship between alcohol consumption and harm, was first published in 1993 (Anderson *et al.* 1993) and updated in 1995 as part of the World Health Organization's Alcohol and Public Policy Project (Anderson 1995). Chapter 3, which has been prepared as a contribution to a World Health Organization report, prevention of mental disorders, an overview of evidence-based strategies and programs (Hosman *et al.* in press), will consider the developments in the scientific literature since the 1993 publication and the 1995 update. Chapter 3 will extend the evidence base by referring to subsequent reviews and meta-analyses, will discuss the importance of the patterns of drinking as well as the volume of alcohol consumption in relation to the risk of alcohol, including social harm and intentional and un-intentional injuries, will consider the relationship between alcohol and risk of breast cancer and will return to the question as to whether or not alcohol reduces the risk of coronary heart disease.

Part II The Effectiveness of General Practice in Reducing the Risk of Alcohol

In the 1970s and 1980s, there were increasing calls for the involvement of general practitioners in the management of alcohol use disorders (Shaw *et al*. 1978). Whilst the evidence base for the effectiveness of general practitioners in smoking cessation was growing, there had been only two published studies investigating the effectiveness of general practitioners in reducing heavy drinking, one of which found a treatment effect (Wallace *et al.* 1988) and one of which failed to find a treatment effect, probably due to insufficient power (Heather *et al*. 1987). Chapter 4 will report on a randomized controlled trial designed to test the effectiveness of general practitioners' advice to heavy drinking men and women, which was published as two papers, one in 1990 (Scott & Anderson 1990) and one in 1992 (Anderson & Scott 1992). Chapter 5, which has been prepared as a contribution to a publication, prevention of cardiovascular disease, evidence based approach (Neil *et al.* in press), will consider recent developments in the effectiveness of interventions for hazardous and harmful alcohol consumption. The chapter will refer to the results of meta-analyses and will discuss the potential of increasing the effectiveness of general practice based interventions.

Part III The Attitudes of General Practice to Reducing the Risk of Alcohol

In the 1970s, The Maudlsey Alcohol Pilot Project was set up by the Department of Health in England to make proposals for the design of services to respond to drinking problems, with a particular emphasis on the role of primary health care providers (Shaw *et al*. 1978). The project, which was pilot in both the sense of being an experimental undertaking carried out prior to countrywide dissemination, and in the sense of being a leader or guide as to the way forward, noted that primary health care providers found alcohol problems difficult because they lacked role security and therapeutic commitment. Chapter 6 will describe the development of a shortened version of the Alcohol and Alcohol Problems Perception Questionnaire designed by the Maudlsey Alcohol Pilot Project to measure the attitudes of primary health care providers, including general practitioners, in the management of alcohol problems. The chapter, which was first published as a paper in 1987 (Anderson & Clement 1987), will show that the questionnaire measures how secure general practitioners feel in the management of alcohol problems (do they feel adequate in their role; and do they think that it is a legitimate role) and how therapeutically committed they feel in managing alcohol problems (do they feel motivated; how is their self-esteem when managing alcohol problems; and do they feel satisfied with such work). Chapter 7 will analyze a large dataset of a World Health Organization project on the identification and management of alcohol-related problems to enhance the use of alcohol-related brief interventions in primary health care (Anderson 1996; Monteiro & Gomel 1998), which applied the questionnaire on role security and therapeutic commitment, described in chapter 6. The chapter will explore the perceptions of the general practitioners and the extent to which their views concur with those of the Maudlsey Alcohol Pilot Project, which proposed that both education and support would be required to engage general practitioners in the management of alcohol problems.

Part IV Involving General Practice in Reducing the Risk of Alcohol

Although there has been a considerable development in the knowledge of how to increase the involvement of primary health care providers in clinical preventive medicine (Hulscher *et al.* 2002), the extent to which these interventions apply to the specific and special situation of the management of alcohol use disorders, which general practitioners find difficult, is not known. Chapter 8 will report on a meta-analysis of a systematic review of different strategies to increase the involvement of general practitioners in delivering screening and intervention programmes to reduce the harm done by alcohol. The review will use the methodology of the Effective Practice and Organization of Care Group of the Cochrane Collaboration (Bero *et al.* 2002). Chapter 9 will analyze data from a World Health Organization study that investigated the effectiveness of an intervention to enhance the utilization of a brief intervention package for hazardous and harmful alcohol consumption. The chapter will explore the relationships between the general practitioners' attitudes in working with patients with alcohol problems and the impact of the intervention on their clinical behaviour.

Concluding chapter

Finally, chapter 10 will consider how the findings of the thesis might contribute to a more effective response for the role of general practice in reducing the risk of alcohol, with recommendations for research, practice and policy.

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PART I

THE RISK OF ALCOHOL

CHAPTER 2

WHAT IS THE RISK OF ALCOHOL: A SYSTEMATIC REVIEW[1]

ABSTRACT

Aims To describe the dose response relationships between alcohol consumption and risk for a variety of physical harms; to identify the risk of reported levels of alcohol consumption; to determine if existing guidelines on upper limits of lower risk drinking are appropriate.

Methods A 'Medline' search identified 156 papers reporting 131 studies. Consumption data were converted to grams of pure alcohol. The studies were described and graphs were plotted for each disease relating the midpoint of consumption range to relative risk.

Findings Overall, there was evidence for a dose-response relationship between level of alcohol consumption and risk of harm for liver cirrhosis, cancers of the oropharynx, larynx, oesophagus, rectum (beer only), liver and breast, and blood pressure and stroke. An increased risk of cardiac arrhythmias, cardiomyopathy and sudden coronary death was associated with heavy drinking. There was evidence for a protective effect of alcohol consumption against risk of coronary heart disease, which could be achieved at consumption levels of less than 10 g alcohol a day. The total mortality of non-drinkers was higher than that of moderate drinkers in two-thirds of studies that reported on total mortality. Level of alcohol consumption and total mortality were dose-related when non-drinkers were excluded. The finding of a dose-relationship between alcohol and harm suggested causality.

Conclusions Although it was not possible to define individual risk for all harms at a given level of alcohol consumption because of variations in methodology, at reported levels of alcohol consumption of more than 20-30 g a day, all individuals are likely to accumulate risk of harm. Existing guidelines on upper limits of lower risk drinking in different countries (168-280 g of alcohol a week for men and 84-140 g a week for women) reflect levels at which the risk of total mortality is not greatly increased above one.

Note to the reader The detailed and technical content of this chapter is summarized in Box 2.1 on page 24. Readers who wish to avoid the detail, without missing out on the main findings of the chapter are referred to this box.

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INTRODUCTION

In 1870 Anstie stated that an intake of 'three or four glasses of port wine a day…1.5 ounces of absolute alcohol' was 'about the limit of what can be habitually taken…without provoking symptoms of chronic malaise' (Anstie 1870). This is equivalent to about 28 units of alcohol a week, or 40 g pure alcohol a day, where, in the United Kingdom, one UK unit is equivalent to about 10 g of pure alcohol, contained in a single measure of spirits, a glass of wine, or a half a pint of standard strength beer. Just over a hundred years later the Royal College of Psychiatrists suggested that 'four pints of beer a day, four doubles of spirits, or one standard size bottle of wine, constitute reasonable guidelines for the upper limit of drinking' (Royal College of Psychiatrists 1979), an intake of 56 units of alcohol a week or 80 g a day. Both recommendations imply a threshold above which damage is likely to occur.

During the 1980s the emphasis shifted from providing information about danger levels to the need for 'safe', 'sensible' or more accurately upper limits for lower risk levels of drinking (Chief Medical Officer 1989). Reports from the three UK Royal Colleges of Psychiatrists (1986), General Practitioners (1986) and Physicians (1987) showed a consensus that it was sensible for women to drink no more than 14 units a week and men 21 units. Intakes of alcohol from 15-35 units and 22-49 units a week for women and men respectively were considered hazardous and levels above this dangerous. In Australia, recommended levels of alcohol consumption were higher for men, with low risk, sensible limits being 28 units per week, but similar for women, being 14 units per week (Pols & Hawks 1987).

It is pertinent to ask on what data these figures were based. Accurate information is difficult to obtain especially in relation to individuals at risk, because of the many confounding variables. The relevant epidemiological studies relating individual drinking habits to risk of morbidity and mortality have therefore been reviewed in the hope of better defining the relationship between alcohol and ill health.

METHOD

A 'Medline' search was conducted for English language papers which analyzed the physical, psychological and social harm that may be related to alcohol use. From a total of about 9000 titles, 800 papers were selected for perusal on the basis of their titles. These were then read and included for detailed review if they contained: (a) a quantitative measure of individual alcohol consumption; and (b) a measure of individual risk outcome related to consumption. Further papers were obtained from the references in these papers and from reviews of different types of physical harm and publications relating to coronary heart disease (Burch, & Giles 1971; Marmot 1984; Klatsky 1985; Criqui 1986; Rogers, & Conner 1986; Velema, *et al*. 1986; Hillbom 1987; Mccall 1987; Macmahon 1987; Tuyns 1987; Longnecker, *et al*. 1988; Prior 1988). The final tally was 156 papers, reporting 131 studies.

Adequate information about consumption and harm was available only for certain conditions; these are discussed in this chapter. Additional evidence includes studies of undefined heavy drinking groups (Nichols *et al*. 1974) or of non-drinking

groups (Enstrom 1978), comparing their health with that of the general population. They do not address the relationship between individual levels of consumption and harm and are not included.

Consumption data were converted to standard measures of pure ethyl alcohol (ethanol) to facilitate direct comparison between studies (the term 'alcohol' is used to refer to pure ethyl alcohol) because of the wide variety of ways of reporting quantities of alcoholic drinks. Fluid ounces, millilitres or grams are used to report quantities of either alcohol or of specified beverages; sometimes authors refer to the number of 'drinks' consumed, with differing definitions of a 'drink', or even with no attempt to define a 'drink'. 'Standard drinks' vary in size from country to country, as does average alcohol content (percentage volume) of various beverages. The effect such variations have on the interpretation of data is discussed in full elsewhere (Turner 1990). All data were converted to equivalent grams (g) of alcohol, using the following conversion factors: 1 ml = 0.785 g alcohol; 1 fl. oz. = 28.41 ml (UK); 1 fl.oz. = 29.58 ml (US). If a paper gave data as a volume of beverage without sufficient information to convert directly to grams of alcohol, the alcohol content was calculated from an assumed average percentage volume, of beer 4%, wine 12%, spirits 40%. If a 'drink' was undefined the average alcohol content was assumed to be 12 g in US, 10 g in Australia/Europe and 21.2 g in Japan.

For each set of data, the midpoint (in g alcohol) of each quoted range of consumption was calculated. Where the highest consumption category had no upper limit, the lowest value was used. A single quantity of alcohol could then be related to the risk of harm.

If not given, relative risk (RR) was calculated from the crude data. In most papers, non-drinkers were used as a baseline with a relative risk of 1.0; where moderate drinkers were used relative risk was recalculated using non-drinkers as the baseline where possible. Data were entered onto a computerized database in tabular form and used to generate graphs for each disease relating the midpoint of consumption range (grams) to relative risk.

Nine papers were excluded because results were published in graphic form, making it impossible to be sure of exact data (Harburg *et al*. 1980; Barboriak et *al*. 1982; Cairns et *al*. 1982; Milon et *al*. 1982; Kondo, & Ebihara 1984; Jackson et *al*. 1985; Welte & Greizerstein 1985; Criqui et *al*. 1987; Koskinen et *al*. 1987). A further nine were excluded either because the disease category was too broad to compare with other studies - 'head and neck' cancers (Feidman & Boxer 1979; Herity *et al*. 1981), 'lower urinary tract cancer' (Claude *et al*. 1986) or there were insufficient data about a particular disease - coronary artery occlusion (Gruchow *et al*. 1982), accidents to pedestrians (Haddon *et al*. 1961), diabetes mellitus (Stampfer *et al*. 1988a), psoriasis (Chaput *et al*. 1985), osteonecrosis of the femoral head (Matsuo *et al*. 1988), and carcinoma of the prostate (Wynder *et al*. 1971).

RESULTS

The results are summarized in Box 2.1.

Box 2.1 The risk of alcohol.

Condition	Summary of findings
Cirrhosis of the liver	All 6 studies demonstrated a dose response relationship, even at low doses. At a given level of alcohol consumption, women are at increased risk compared with men.
Cancers	All 9 studies of primary liver cancer, all 12 studies of cancer of the oropharynx, 10 of 13 studies of cancer of the larynx, all 9 studies of cancer of the oesophagus, and 5 of 6 studies of cancer of the rectum demonstrated a dose response relationship. All 6 studies of cancer of the stomach, 4 of 5 studies of cancer of the colon and 9 of 11 studies of cancer of the pancreas demonstrated no relationship.
Breast cancer	All 5 cohort studies and 6 out of 12 case control studies demonstrated a dose response relationship. Until the effect of alcohol consumption can be convincingly accounted for by adjustment of other variables, it should be treated as a predisposing factor.
Stroke	4 of 5 prospective studies but neither of 2 case control studies demonstrated a dose response relationship. The 4 studies which analyzed haemorrhagic stroke and ischaemic stroke found a dose response relationship for haemorrhagic stroke, and a reduced risk (2 studies) or no relationship (2 studies) for ischaemic stroke.
Coronary heart disease	Of 14 studies in men, 7 demonstrated a significant negative relationship, 3 a non-significant negative relationship, 1 no relationship and 3 a non-significant positive relationship. The negative relationship appeared to be stronger for coronary heart disease incidence than death. Of 4 studies in women, 3 demonstrated a significant negative relationship and 1 no relationship. The reduction in risk was 25-50% at reported consumption levels of 30-40g/day. Not only former drinkers, but also never drinkers, had a higher incidence of coronary heart disease than moderate drinkers. The protective effect remained when those with cardiovascular illness or risk factors at enrolment were removed from the analysis. A higher risk in non-drinkers was found in both Japanese Americans of whom 47% of men were non-drinkers and in British civil servants, of whom 6% of men were non-drinkers. The J-shaped function was most pronounced for current cigarette smokers and the greatest mortality was found amongst non-drinkers who smoked.
Total mortality	12 prospective studies in men showed a relationship between drinking and mortality, of which 8 were J-shaped, 1 a risk for heavy drinkers and 3 a trend that was not significant. Similar results were obtained in the 4 studies of women. The lowest risk of mortality occurred at reported consumption levels of around 20g/day (two drinks a day).

Cirrhosis of the liver

Men All six studies showed a significant association between drinking alcohol and cirrhosis (Pequinot *et al.* 1978; Kagan *et al.* 1981; Tuyns & Pequinot 1984; Coates *et al.* 1986; Kono *et al.* 1986; Boffetta & Garfinkel 1990) (Figure 2.1; the data have been truncated at 70 g per day to enable a clear demonstration of the dose-response relationship at lower levels of consumption). Of these, five showed a dose-response relationship (Pequinot *et al.* 1978; Kagan *et al.* 1981; Tuyns & Pequinot 1984; Coates *et al.* 1986; Boffetta & Garfinkel 1990) which may be log-linear (Pequinot *et al.* 1978; Tuyns & Pequinot 1984; Boffetta & Garfinkel 1990) and one (Kono *et al.* 1986) a significantly increased risk for heavy drinkers only. Three of the studies are prospective (Kagan *et al.* 1981; Kono *et al.* 1986; Boffetta & Garfinkel 1990) and use death from cirrhosis as the end-point of the study. These are the Male Japanese Physicians study of 5477 Japanese doctors, with a 19-year follow-up and data adjusted for the effects of age and smoking (Kono *et al.* 1986), the Honolulu Heart Study of 7591 Japanese men aged 45-69, living in Hawaii, with a 9-year follow-up and data adjusted for age (Kagan *et al.* 1981), and the American Cancer Society Prospective Study of 276302 men aged 40-59, with a 12-year follow-up and data adjusted for age and smoking (Boffetta & Garfinkel 1990).

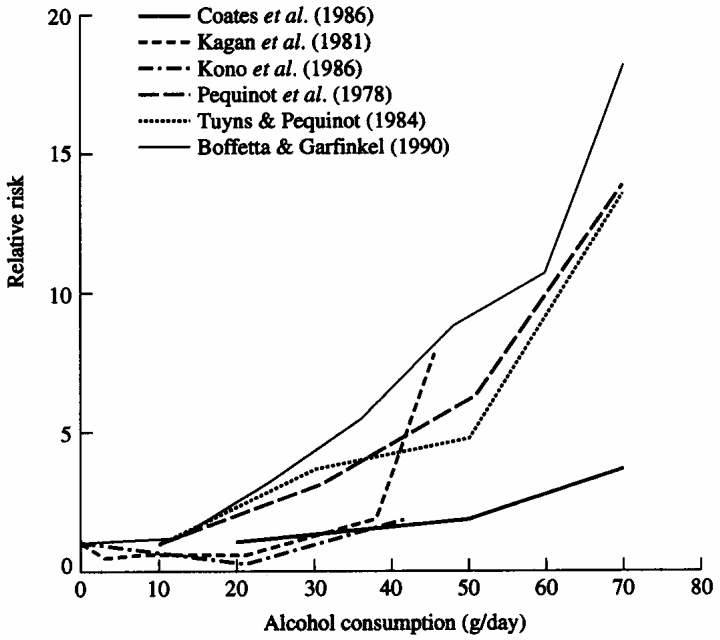

Figure 2.1 Alcohol consumption and incidence of cirrhosis of the liver in men. Data truncated at 70g/day.

The three case-control studies review incident cases of cirrhosis (Pequinot *et al.* 1978; Tuyns & Pequinot 1984; Coates *et al.* 1986). Controls used in these studies are from the general population. Current or recent alcohol consumption (Pequinot *et al.*

1978; Kagan *et al.* 1981; Coates *et al.* 1986; Kono *et al.* 1986; Boffetta & Garfinkel 1990) or an estimate of average daily consumption over a lifetime (Tuyns & Pequinot 1984) were used. Two studies are controlled for both the effects of age and smoking (Kono *et al.* 1986; Boffetta & Garfinkel 1990), whereas other studies are controlled for the effect of age. No study had data on history of hepatitis or on hepatitis serological markers. Studies consider cirrhosis in all adult men except for one study which is limited to those men aged 45-69 (Kagan *et al.* 1981). Using the data from the Pequinot study (Pequinot *et al.* 1978), the estimated regression coefficient from a logistic linear model has been calculated as 0.039, indicating that a man drinking an extra 20 g of alcohol a day multiplies his odds ratio of cirrhosis by approximately 2.2 (Duffy 1992a).

Women Two case-control studies considered women (Tuyns & Pequinot 1984; Coates *et al.* 1986) and both demonstrated a dose-response relationship; both found a higher risk for women than men at any given level of alcohol consumption (Figure 2.2). It was not possible to calculate the relative risk from a further report (Norton *et al.* 1987).

Men and women A further prospective study of both men and women, using mortality as the end-point, again demonstrated a dose-response relationship (Klatsky *et al.* 1981*a*).

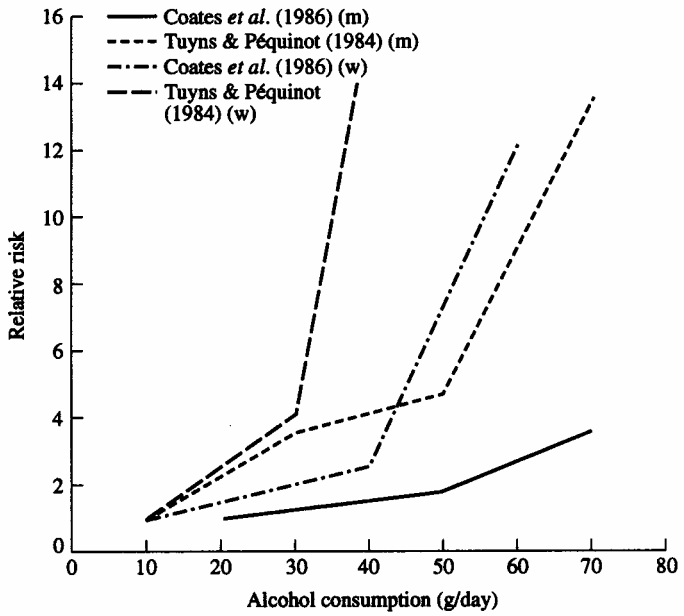

Figure 2.2 Alcohol consumption and incidence of cirrhosis of the liver in men (m) and women (w). Data truncated at 70g/day.

Cancers

Alcohol and risk of cancer has been the subject of a number of major and comprehensive reviews (Holman & Armstrong 1990; Duffy & Sharples 1992; IARC 1988; Doll *et al. 199*3).

The International Agency for Research on Cancer's monograph reviewed cancers across 22 different sites and concluded that alcohol is causally related to cancers of the oral cavity, pharynx, larynx, oesophagus, and liver, independent of cigarette smoking (IARC 1988).

Duffy and Sharples (1992) reviewed cancers across 11 different sites, and concluded that alcohol is causally related to cancers of the oral cavity, pharynx, larynx, oesophagus, and liver. They suggested that breast cancer should probably be added to the list of cancers caused by alcohol drinking and that drinking alcohol may possibly increase the risks of cancers of the large bowel and stomach.

Although there was significant heterogeneity across studies for most of the cancers they reviewed, Duffy and Sharples (1992) calculated pooled relative risks for drinkers compared with non-drinkers and pooled estimates of trends in log-odds ratios with increasing alcohol consumption (ml/day) for cancers, together with a pooled estimate of the increased risk (per cent) at consumption levels of an average 20 g a day, compared with no consumption, controlled, where appropriate for cigarette smoking (Table 2.1).

Table 2.1 Pooled estimate of relative risk in drinkers, compared to non-drinkers, trends in log-odds ratio with increasing alcohol consumption (ml/day) for cancers, and increased risk (%) at consumption levels of, on average, 20g a day, compared with no consumption.

Cancer	Relative risk in drinkers compared to non-drinkers	Trends in log-odds ratio of relative risk	Increased risk (%) with increase in consumption of 20 g
Oral cavity[a]	1.40 (ns)	0.0083 ($P<0.001$)	19
Pharynx[a]	1.49 (ns)	0.010 ($P<0.001$)	24
Larynx[a]	2.20 (ns)	0.013 ($P<0.001$)	31
Oesophagus[a]	1.30 (ns)	0.0049 ($P<0.001$)	10
Stomach	1.17 ($P<0.05$)	0.0025 (ns)	6
Colorectal	1.21 ($P<0.001$)	0.0031 (ns)	7
Lung[a]	0.96 ($P<0.05$)	0.501[b] (ns)	–
Female breast	1.20 ($P<0.001$)	0.59[b] ($P<0.001$)	10
Pancreas	1.03 (ns)	0.0018 (ns)	–
Bladder	1.07 (ns)	0.058[b]	–
Liver	1.56 ($P<0.001$)	0.0066 ($P<0.001$)	14

[a] Adjusted for smoking. [b] Trend in litres of ethanol per week. ns, not significant.

Source: Duffy & Sharples (1992).

In their review of cancers across 11 different sites, Holman and Armstrong (1990) identified less heterogeneity between studies for different cancer sites than Duffy and Sharples (1992) and concluded that, with the exception of cancer of the oral cavity, in which women were at lower risk, the magnitude of risk was the same for both men and women.

Doll *et al.* (1993) and colleagues reviewed cancers of the digestive tract (excluding liver) and larynx and concluded that alcohol is causally related to cancers of

the mouth (other than salivary glands), pharynx (other than the nasopharynx), larynx, and possibly colorectum.

In the current review, a dose-response relationship was found between alcohol consumption and risk of primary hepatocellular carcinoma (primary liver cancer) (Kono *et al*. 1986; Hardell *et al*. 1985; Oshima *et al*. 1984; Stemhagen *et al*. 1983; Yu *et al*. 1988; Austin *et al*. 1986; Yu *et al*. 1983; Bulatao-Jayme *et al*. 1982; Trichopoulos *et al*. 1987). Caution is necessary, however, because some studies (Kono *et al*. 1986; Hardell *et al*. 1985; Stemhagen *et al*. 1983; Yu *et al*. 1988) were not adjsuted for confounding factors such as hepatitis B and hepatotoxins. When this was done in one paper (Tricho poulos *et al*. 1987) no dose-response relationship was found.

A clear dose-response relationship was demonstrated in all 12 studies of men with cancer of the oropharynx (Tuyns *et al*. 1998; Brugere *et al*. 1986; Vincent & Marchetta 1963; Martinez 1969; Rothman & Keller 1972; Blot *et al*. 1988; Keller & Terris 1965; Graham *et al*. 1977; Bross & Coombs 1976; Elwood *et al*. 1984; Wynder & Bross 1957; Olsen *et al*. 1985; Graham *et al*. 1981; Brownson & Chang 1981; Hinds *et al*. 1979; De Stefani *et al*. 1987; Wynder *et al*. 1956; Burch *et al*. 1981; Herity *et al*. 1982; Guenel *et al*. 1988; Olsen *et al*. 1985), in 10 of 13 studies of men with cancer of the larynx (Tuyns *et al*. 1998; Brugere *et al*. 1986; Vincent & Marchetta 1963; Elwood *et al*. 1984; Graham *et al*. 1981; Brownson & Chang 1981; Hinds *et al*. 1979; De Stefani *et al*. 1987; Wynder *et al*. 1956; Burch *et al*. 1981; Herity *et al*. 1982; Guenel *et al*. 1988; Olsen *et al*. 1985), and in all nine studies of men with cancer of the oesophagus (Martinez 1969; Wynder & Bross 1961; Vassallo *et al*. 1981; Pottern *et al*. 1981; Victoria *et al*. 1987; Tuyns *et al*. 1977; Tuyns *et al*. 1979; Tuyns 1983; Yu *et al*. 1988) (Figure 2.3).

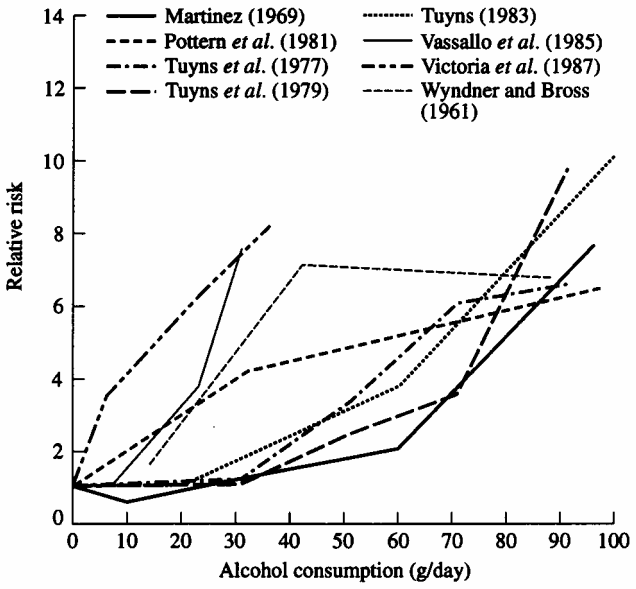

Figure 2.3 Alcohol consumption and incidence of cancer of the oesophagus in men.

All, except two studies (Vincent & Marchetta 1963; Wynder & Bross 1961), gave data adjusted for cigarette smoking. The evidence suggests a direct toxic effect, with spirits being more powerful than other types of alcohol. The relationship is independent of, but additive to, that of cigarette smoking. Information about women (Vincent & Marchetta 1963; Martinez 1969; Blot *et al*. 1988; Bross & Coombs 1976; Elwood *et al*. 1984; Wynder & Bross 1957; Olsen *et al*. 1985; Guenel *et al*. 1988; Wynder & Bross 1961; Yu *et al*. 1988; Pollack *et al*. 1984) is less certain because of inadequate numbers of studies and sample sizes, but suggests a similar relationship, in which the magnitude of risk is similar to that for men.

No consistent association was found between alcohol and stomach cancer (Kono *et al*. 1986; Klatsky *et al*. 1981a; Pollack *et al*. 1984; Gordon & Kannel 1984; Hoev *et al*. 1981; Hu *et al*. 1988), although two prospective studies (Pollack *et al*. 1984; Gordon & Kannel 1984) and one case control study (Hu *et al*. 1988) suggested a risk among heavy drinkers. The position with colorectal cancer is complex: a dose-response relationship was found in five of six reports of rectal cancer in men, mostly for beer (Pollack *et al*. 1984; Kabat *et al*. 1986; Wynder & Shigematsu 1967; Potter & McMichael 1986; Kune *et al*. 1987), but not in a sixth (Klatsky *et al*. 1988). No such relationship was found, however, in four out of five studies of colon cancer (Pollack *et al*. 1984; Wynder & Shigematsu 1967; Miller *et al*. 1983; Kune *et al*. 1987) and women seem to carry no risk of either cancer from drinking. Out of 11 reports of carcinoma of the pancreas and alcohol (Kono *et al*. 1986; Wynder *et al*. 1973; Falk *et al*. 1985; Wynder *et al*. 1983; Norell *et al*. 1986; Hiatt *et al*. 1988a; Mack *et al*. 1986; Gold *et al*. 1985; Manousos *et al*. 1981; Cuzick & Babiker 1989; Raymond *et al*. 1981), an association with beer was found in only two case control studies (Cuzick & Babiker 1989; Raymond *et al*. 1981).

Where a link was found with lung cancer (Kono *et al*. 1986; Klatsky *et al*. 1981a; Herity *et al*. 1982; Pollack *et al*. 1984) it was either weak or disappeared when adjusted for smoking. No consistent evidence was produced of an association between alcohol and either bladder (Brownson *et al*. 1987; Bravo *et al*. 1987; Thomas *et al*. 1983; Wynder *et al*. 1963) or ovarian cancer (Byers *et al*. 1983; Gwinn *et al*. 1986).

Total cancer mortality showed either a dose-response relationship (Kagan *et al*. 1981; Kono *et al*. 1986) or an increased risk for heavy drinkers (Klatsky *et al*. 1981; Dyer *et al*. 1980) (Figure 2.4). In one report (Marmot *et al*. 1981), a U-shaped curve was demonstrated but was not significant.

Cancer of the female breast

Cancer of the female breast is included for more detailed discussion because of its public health importance. Of 17 studies of the incidence of breast cancer in women (Schatzkin *et al*. 1987; Willett *et al*. 1987; Hiatt and Bawo1 1984; Hiatt *et al*. 1988b; Gapstur *et al*. 1992; Le *et al*. 1984; Rohan and McMichael 1988; Harvey *et al*. 1987; Talamini *et al*. 1984; La Vecchia *et al*. 1985; O'Connell *et al*. 1987; Paganini-Hill and Ross 1983; Harris and Wyndner 1988; Webster *et al*. 1983; Byers and, Funch 1982; Miller *et al*. 1987; Begg *et al*. 1983), 11 show a significant positive association (Schatzkin *et al*. 1987; Willett *et al*.1987; Hiatt and Bawo1 1984; Hiatt *et al*. 1988;

Gapstur *et al*. 1992; Le *et al*. 1984; Rohan and McMichael 1988; Harvey *et al*. 1987; Talamini *et al*. 1984; La Vecchia *et al*. 1985; O'Connell *et al*. 1987).

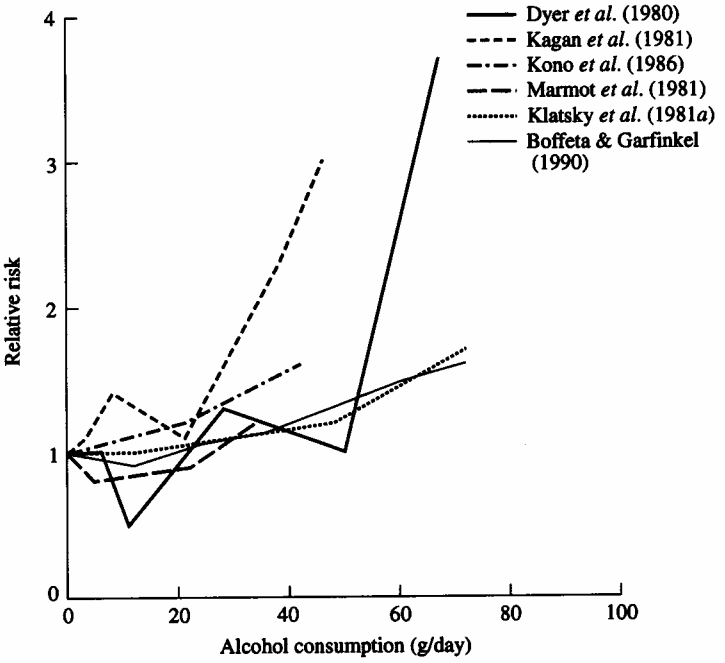

Figure 2.4 Alcohol consumption and mortality rate from all cancers. (The Klatsky *et al.* (1981a) data are for both men and women.)

All five cohort studies, four of which are prospective (Schatzkin *et al*. 1987; Willett *et al*. 1987; Hiatt *et al*. 1988b; Gapstur *et al*. 1992) and one retrospective (Hiatt & Bawo11984), show a significant positive dose-response relationship. Six out of 12 case-control studies find a significant positive relationship (Le *et al*. 1984; Rohan & McMichael 1988; Harvey *et al*. 1987; Talamini *et al*. 1984; La Vecchia *et al*. 1985; O'Connell *et al*. 1987) and in five of these this is a dose-response relationship (Le *et al*. 1984; Rohan & McMichael 1988; Harvey *et al*. 1987; Talamini *et al*. 1984; La Vecchia *et al*. 1985). The other case-control studies find no significant association (Paganini-Hill & Ross 1983; Harris & Wyndner 1988; Webster *et al*. 1983; Byers and Funch 1982; Miller *et al*. 1987; Begg *et al*. 1983).

The consistency of the findings in the five large cohort studies is convincing (Figure 2.5). The 10-year prospective study (from the First National Health and Nutrition Examination Survey: Schatzkin *et al*. 1987) of 7188 women aged 25-74 and the 4-year prospective study (from the Nurses Health Study) of 89538 women aged 30-55 (Willett *et al*. 1987) are adjusted for other, possibly confounding, breast cancer risk factors (age, diet, smoking, body mass index, family history of breast disease, age at menarche, age at first birth, parity, menopausal status). In addition, one study controls for the effect of education (Schatzkin *et al*. 1987) and the other includes benign breast disease (Willett *et al*. 1987). The remaining two studies are from the Kaiser Permanente

group of 88477 women aged over 15 years, reviewed retrospectively over a period of 13 years (Hiatt *et al.* 1988b) and a separate group of 58347 women followed over 6 years (Hiatt & Bawol 1984). These studies were adjusted for the effects of age, race, smoking, and body mass index in both cases, and, in addition, education, parity, cholesterol level, age at menarche, and menopausal status, in the case of the retrospective study. However, the authors were, unfortunately, unable to control for the effect of diet. The Iowa Women's Health Study followed-up 41837 postmenopausal women aged 55-69 for 4 years and adjusted for the effects of age, body mass index, age at menarche, age at first live birth, and family history of breast cancer (Gapstur *et al.* 1992).

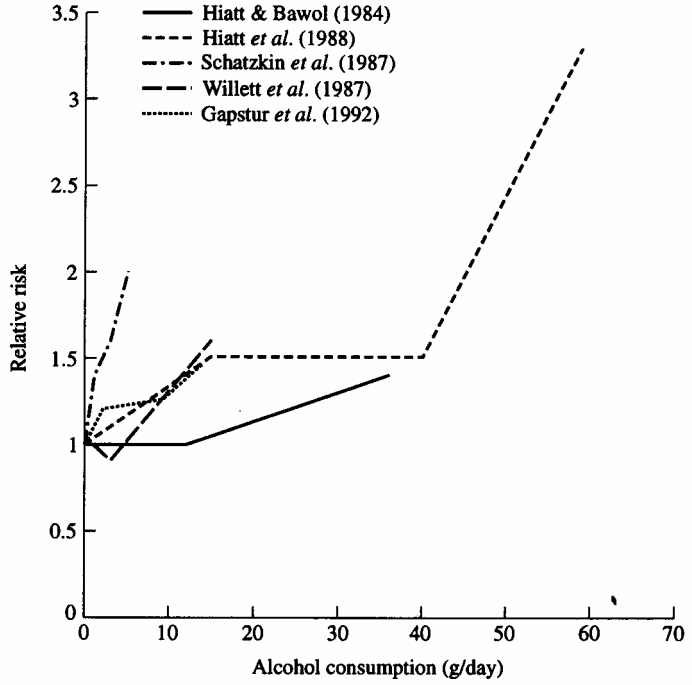

Figure 2.5 Alcohol consumption and incidence of female breast cancer. Data from five prospective studies.

Of the 12 case-control studies, nine are controlled for the majority of other known risk factors for breast cancer. The three studies which are less well controlled, fail to show a relationship [two control only for age (Byers & Funch 1982; Miller *et al.* 1987), and the other only for age and smoking (Begg *et al.* 1983)]. Diet is controlled for in only three of the case-control studies (Talamini *et al.* 1984; La Vecchia *et al.* 1985; O'Connell *et al.* 1987), all of which show a dose-response relationship. The numbers of cases reviewed in these studies range from 239 to 1799, with a mean of 832 cases. Controls used are from the general population in six studies (Rohan & McMichael 1988; Harvey *et al.* 1987; O'Connell *et al.* 1987; Harris and Wyndner 1988; Webster *et al.* 1983; Miller *et al.* 1987) and from hospitals or clinics in the remainder of the studies. All studies use current or recent consumption in assessing alcohol exposure.

In summary, all five of the cohort studies, and six of the 12 case-control studies show a relationship between level of alcohol consumption and risk of breast cancer. Of these 11 studies, 9 demonstrate a dose-response relationship.

Two papers have presented meta-analyses of individual studies. For case-control studies, Longnecker *et al*. (1988) demonstrated a linear dose-response relationship which increased to a risk of 1.5 at a consumption level of 36 g of alcohol a day or more. For cohort studies, the relationship was steeper with a relative risk of 2.0 at a consumption level of 36 g of alcohol a day or more.

The meta-analysis of Howe *et al*. (1991) represents some of the strongest evidence for a causative association of alcohol with breast cancer because it consists of raw data from studies in which detailed dietary histories were taken and for which dietary adjustments could be made. The adjusted relative risk for alcohol consumption at levels of 40 g or more per day was 1.7.

Although there is discussion on whether the association between alcohol consumption and breast cancer is causal or due to confounding variables (McPherson *et al*. 1993), it can be argued that, until the effect of alcohol consumption can be convincingly accounted for by adjustment of other variables, it should be treated as a predisposing factor.

Cardiovascular disease

All types of atrial arrhythmia could be precipitated by heavy drinking (Klatsky *et al*. 1981b; Cohen *et al*. 1988) and alcohol was also a risk factor for cardiomyopathy (Klatsky *et al*. 1981b; Komajda *et al*. 1988).

Six prospective studies of total cardiovascular mortality (Kono *et al*. 1986; Klatsky *et al*. 1981b; Dyer *et al*. 1980; Marmot *et al*. 1981; Semenciw *et al*. 1988; Shaper *et al*. 1988) demonstrated a U-shaped curve (Kono *et al*. 1986; Klatsky *et al*. 1981b; Dyer *et al*. 1980; Semenciw *et al*. 1988; Shaper *et al*. 1988) or no increased risk for heavy drinkers (Marmot *et al*. 1981). In the British Regional Heart Study, the total group was subdivided into 'healthy' and 'unhealthy' men, the latter defined as those with any evidence of cardiovascular disease at enrolment (Shaper *et al*. 1988). The 'protective' effect of moderate drinking was seen only in the unhealthy group.

Wannamethee and Shaper (1988) have further examined the non-drinking group and found that they had an excessive burden of disease, which could account both for the increased cardiovascular mortality and for not drinking.

Blood pressure

Twenty-four papers were retrieved for analysis: 19 studies (80%) (Fortmann *et al*. 1983; Criqui *et al*. 1981; Weissfew, *et al*. 1988; Klatsky *et al*. 1986; Reed *et al*. 1982; Ueshima *et al*. 1984; Mitchell *et al*. 1980; Paulin *et al*. 1985; Savdie *et al*. 1984; Macmahon *et al*. 1984; Cooke *et al*. 1982; Arkwright *et al*. 1983; Eujott *et al*. 1987; Gordon & Kannel 1974; Gyntelberg & Meyer 1974; Trevisan *et al*. 1987; Lang *et al*. 1987; Defrank *et al*. 1987; Dyer *et al*. 1977) showed a significant dose-response relationship in men, two a non-significant dose response relationship (Coates *et al*. 1985; Baghurst *et al*. 1981) and three a significant increase in blood pressure in heavy drinkers (Marmot *et al*. 1981; Sawat *et al*. 1986; Bulpitt *et al*. 1987).

What appeared to be a threshold effect was detected in 38% of studies. While similar findings were reported in women, no significant association (Coates *et al*. 1985; Fortmann *et al*. 1983; Paulin *et al*. 1985; MacMahon *et al*. 1984; Bulpitt *et al*. 1987), or a U-shaped curve (Criqui *et al*. 1981) were observed in six of 13 studies.

Stroke

Men The results of seven studies of men, two case-control (Gill *et al*. 1986; Shaper *et al*. 1991) and five prospective studies (Kono *et al*. 1986; Boffetta & Garfinkel 1990; Donahue *et al*. 1986; Semenciw *et al*. 1988; Ben-Shlomo *et al*. 1992) are summarized in Figure 2.6. Four of the prospective studies demonstrate a dose-response relationship (Kono *et al*. 1986; Boffetta & Garfinkel 1990; Donahue *et al*. 1986; Semenciw *et al*. 1988) and one no relationship (Ben-Shlomo *et al*. 1992); one case-control study demonstrates a significant U-shaped curve (Gill *et al*. 1986) and the other a non-significant dose-response relationship (Shaper *et al*. 1991).

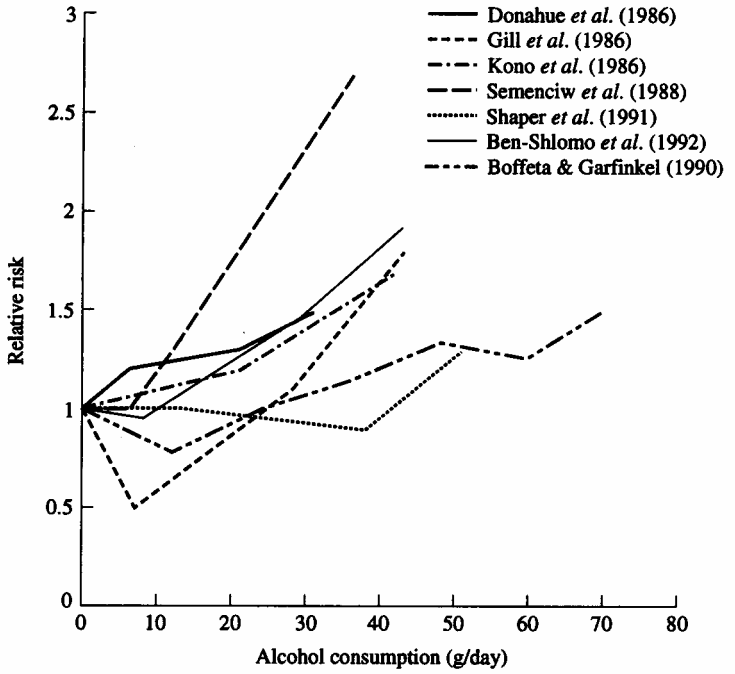

Figure 2.6. Alcohol consumption and incidence of stroke in men. Data from seven studies.

The Male Japanese Physicians Study (Kono *et al*. 1986) and the American Cancer Society Prospective Study (Boffetta & Garfinkel 1990) found a significant dose-response relationship between stroke mortality and level of alcohol consumption. Data were adjusted for age and smoking. The Honolulu Heart Study found a dose-response relationship between alcohol consumption levels and incidence of stroke, after a 12-year follow-up (Donahue *et al*. 1986). Data were adjusted for age and smoking, and also for blood pressure, body mass index, serum cholesterol, uric acid, glucose, and

haematocrit. In the Nutrition Canada Survey, 3146 men who were free of self-reported heart disease or stroke, aged 35-79, were followed-up for 11 years (Semenciw *et al*. 1988). The data, which were adjusted for age, smoking, diabetes, and diastolic blood pressure showed a dose-response relationship between alcohol consumption and stroke mortality. The British Regional Heart Study found no relationship between alcohol consumption and incidence of stroke in 7735 men with a 7.5-year follow-up (Ben-Shlomo *et al*. 1992). Data were adjusted for age, systolic blood pressure, and smoking. When the total group was subdivided into a group of 5856 'healthy' and 1873 'unhealthy' men, the latter defined as those with any evidence of cardiovascular disease at enrolment (Shaper *et al*. 1988), there was a significant dose-response relationship between alcohol consumption and the risk of stroke among the 'unhealthy' men, after adjustment for age, smoking, and systolic blood pressure, but no relationship was found among the 'healthy' men.

Gill's case-control study of 143 men aged 20-70 also showed a dose-response relationship, but with a U-shaped curve (Gill *et al*. 1986). The data in this study were adjusted for blood pressure, smoking, medication, age, sex, and race. The study, in its first report used hospital controls. The second case-control study showed a non-significant dose-response relationship. Data were adjusted for age, sex, social class, cigarette smoking, and history of hypertension (Shaper *et al*. 1991).

Because there is a linear dose-response relationship between alcohol consumption and blood pressure, controlling for blood pressure will remove some of the alcohol effect for risk of stroke. This was evident for the two studies which demonstrated a significant dose-response relationship when only controlling for age, although failed to demonstrate a dose-response relationship when controlling for age, smoking, and blood pressure (Shaper *et al*. 1991; Ben-Shlomo *et al*. 1992). The stroke studies have also demonstrated how the risk associated with alcohol consumption varies depending on the choice of control group, with different biases associated with selection of different control groups (Ben-Shlomo *et al*. 1992).

Women Two of the above studies are also of women. There was a positive association between stroke mortality and heavy drinking for the 3971 women in one follow-up study, but no dose-response relationship was demonstrated (Semenciw *et al*. 1988). In the case-control study of 87 women, no significant association was found, but there were only three women who usually drank more than one drink a day (Gill *et al*. 1986). A further prospective study, the Nurses Health Study of 87526 female American nurses, with an 8-year follow-up shows a U-shaped relationship between level of alcohol consumption and incidence and mortality from stroke (Stampfer *et al*. 1988b). This study adjusts the data for blood pressure, age, family history, obesity, exercise, fat intake, smoking, diabetes, cholesterol, menopausal status, and hormone use.

Men and women Two further studies investigate both men and women. The Kaiser Permanente group followed-up men and women for five years and found a non-significant dose-response relationship between alcohol consumption and level and risk of hospitalization for stroke (Klatsky *et al*. 1981b) and a U-shaped relationship between alcohol consumption and risk of stroke mortality (Klatsky *et al*. 1990a). These data are adjusted for age, sex, race, and smoking but not for blood pressure. A case-control study of 209 men and women shows a significant protective effect of drinking for all strokes (Von Arbin *et al*. 1985). The data are adjusted only for age and sex.

Four of the above studies subdivide stroke into non-haemorrhagic and haemorrhagic stroke (Figure 2.7).

Non-haemorrhagic stroke

A dose-response relationship was seen for non-haemorrhagic stroke in the Japanese Physicians Study (Kono *et al*. 1986), significant only for heavy drinkers. The Honolulu Heart Study (Donahue *et al*. 1986) showed no significant association, the Nurses' Health Study (Stampfer *et al*. 1988b) showed an inverse, U-shaped association, and the Kaiser Permanente study showed a reduced risk among drinkers compared with non-drinkers (Klatsky *et al*. 1990a).

The Male Japanese Physicians Study, when analysing data on ex-drinkers, found an overall excessive mortality rate, and this was due in part to a significant excess mortality rate from non-haemorrhagic stroke (Kono *et al*. 1986).

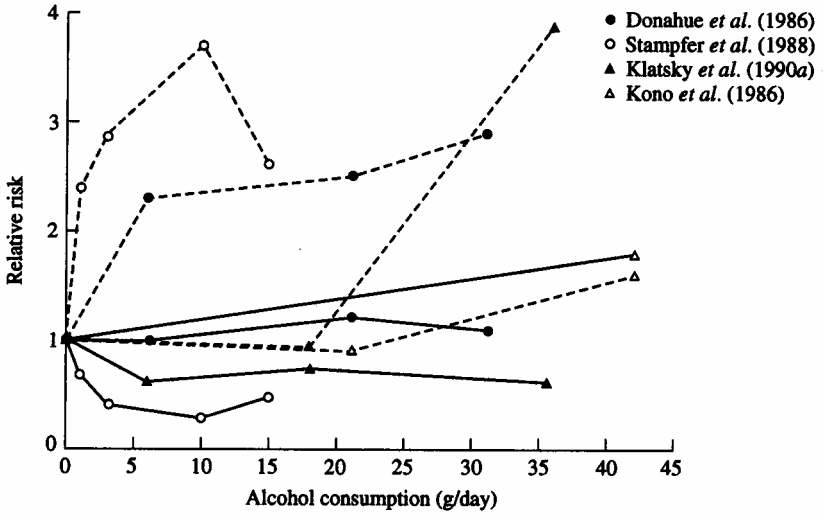

Figure 2.7 Alcohol consumption and incidence of stroke (---, haemorrhagic; —, non-haemorrhagic). Data from four studies.

Haemorrhagic stroke

A significant dose-response relationship was found in the Kaiser Permanente study for total haemorrhagic stroke (Klatsky *et al*. 1990a) and a significant dose-response relationship was found in the Honolulu Heart Study (Donahue *et al*. 1986) for subarachnoid haemorrhage, but not for intracerebral haemorrhage. A dose-response relationship was also seen in the Nurses' Health Study (Stampfer *et al*. 1988b) for subarachnoid haemorrhage but this was not significant due to small numbers. The Japanese Physicians Study (Kono *et al*. 1986) showed an increased risk in heavy drinkers, but it was not statistically significant.

In summary, there is evidence of a dose-response relationship between level of alcohol consumption and all strokes in men. There is some evidence of a positive relationship for women, which may be U-shaped. The evidence suggests that drinking

alcohol increases the risk of subarachnoid haemorrhage, more than other types of stroke. Further studies should report data both with and without controlling for blood pressure.

Coronary heart disease

Studies vary in their definition of coronary heart disease. Some use death from all coronary heart disease as their definition of the disease studied, others incident myocardial infarction, incident angina, coronary insufficiency, sudden coronary death, or a combination of these. This makes it difficult to compare data from different studies. Because of these differences in definitions, papers are discussed according to whether they describe coronary heart disease deaths, a combination of incidence and death, or sudden coronary death.

Mortality rates

Men Ten studies of total coronary heart disease (CHD) mortality (Kono *et al*. 1986; Boffetta & Garfinkel 1990; Dyer *et al*. 1980; Yano *et al*. 1977; Hennekens *et al*. 1978; Gordon & Kannel 1983; Suhonen *et al*. 1987; Camacho *et al*. 1987; Gordon & Doyle 1987; Jackson *et al*. 1991) failed to show a significant positive association; five, however, showed a significant negative association (Boffetta & Garfinkel 1990; Hennekens *et al*. 1978; Gordon & Kannel 1983; Gordon and Doyle 1987; Jackson *et al*. 1991) and three of these had a U-shaped curve (Boffetta & Garfinkel 1990; Hennekens *et al*. 1978; Jackson *et al*. 1991).

In the Albany study, Gordon *et al*. (1987) followed-up a group of 1910 men aged 38-55 for 18 years. The study found a non-significant U-shaped association between alcohol use and CHD deaths. They then followed-up 979 of the same men now aged 56-73 for a further 10 years and a significant negative dose-response relationship was shown. This study was controlled for smoking, age, blood pressure, and weight. In the Framingham study, Gordon and Kannel (1983) followed-up a group of 2026 men aged 29-62 for 22 years and found a significant negative response, which was U-shaped. This paper commented that analysis of the various forms of CHD deaths suggested that there may be a positive association for sudden coronary death, and that the negative association was due to acute myocardial infarction and non-sudden CHD deaths. In the American Cancer Society Prospective Study, 276,802 men aged 40-59 were followed-up for 12 years and a significant negative association was found between alcohol consumption and risk of death from coronary heart disease (Boffetta & Garfinkel 1990). Data were adjusted for age and smoking. The protective effect of alcohol remained when excluding subjects with poor health or history of chronic disease at enrolment or excluding subjects who died during the first six years of follow-up. The Auckland Community study is a case-control study of 227 men and demonstrated a significant negative association (Jackson *et al*. 1991). Controls were selected from the community and data were adjusted for age, smoking, hypertension, social class, exercise, and recent change in drinking. Total abstainers had a similar risk of dying from CHD to people who were former drinkers, but who did not currently drink. The final paper suggesting a significant negative relationship (also U-shaped) is a case control study of 568 men aged 30-70 (Hennekens *et al*. 1978). The data are adjusted for smoking, religion,

weight, and hospitalization for heart disease. The significance of the protective effect is confined to those drinking less than 46 g/day.

The remaining five papers showing no significant effect can be divided into those with a negative (but non-significant) trend (Kono *et al*. 1986; Yano *et al*. 1977), and those with a non-significant positive trend (Dyer *et al*. 1980; Suhonen *et al*. 1987; Camacho *et al*. 1987). The Honolulu Heart Study showed a non-significant negative trend for all CHD deaths (Yano *et al*. 1977). If the numbers of CHD deaths are added to the numbers of incident cases of myocardial infarction (MI), the trend is of a significant inverse dose-response relationship. The Male Japanese Physicians Study (Kono *et al*. 1986) showed a non-significant negative association for all coronary heart disease deaths. Acute MI deaths show a significant inverse dose-response relationship, whereas other, non-acute MI CHD deaths show a non-significant positive association at high levels of drinking. The Finnish Social Insurance Institute's Mobile Health Clinic Survey (Suhonen *et al*. 1987) followed-up 4532 men for five years and found no significant trend for 40-64 year-olds for all CHD deaths. There was a non-significant positive dose-response relationship, which was strongest in the 60-64 year-old group of men. The Alameda Cohort (Camacho *et al*. 1987) and the Chicago Western Electric Study (Dyer *et al*. 1980) both showed a positive trend in 15- and 17-year prospective studies (respectively). Subsequent analysis of the Alameda Cohort data (Lazarus *et al*. 1991) found no difference in risk of ischaemic heart disease for men who continued to drink and men who gave up drinking during a 10-year period.

Women The Framingham Study (Gordon & Kannel 1983) showed a significant inverse relationship for CHD deaths and the Alameda Cohort Study (Camacho *et al.* 1987) no significant trend. The Auckland Community Study found a significant negative association with a U-shaped curve (Jackson *et al*. 1991). Additional analysis of the Alameda Cohort data (Lazarus *et al.* 1991), found that there was a significantly higher risk of death from ischaemic heart disease in women who gave up drinking during a 10-year period, compared with women who continued to drink.

Men and women Colditz *et al.* (1985) followed a group of 1184 people aged 66 years or older for an average of 4.75 years and found a significant (U-shaped) protective effect for moderate drinkers, after adjustment for age, sex, smoking, and cholesterol.

Incidence and mortality

Some of the papers mentioned in the preceding section on CHD mortality, also include data about incidence or a combination of incidence and death from CHD. In addition, there are further articles which only give data on incidence or on a combination of incidence and death.

Men In men there are seven such studies (Kagan *et al*. 1981; Suhonen *et al*. 1987; Jackson *et al*. 1991; Shaper *et al*. 1987; Rimm *et al*. 1991; Kittner *et al*. 1983; Scragg *et al*. 1987). Two studies look at a combination of incidence and deaths. An early report from the British Regional Heart Study of 7729 men aged 40-59 followed for 6.2 years (Shaper *et al*. 1987) found a non-significant, U-shaped relationship between consumption and 'major ischaemic heart disease events' (including all CHD deaths and non-fatal myocardial infarction). Data are adjusted for the effects of age,

smoking, body mass index, and socio-economic status. Analysis at 9.5-year follow-up found a shallow U-shaped relationship for all CHD events and an inverse association with fatal CHD events. The relationships were strongest in older men and in ex-smokers, current smokers, manual workers, and those with doctor diagnosed cardiovascular disorders or symptomatic coronary heart disease (Shaper *et al*. 1994). The Honolulu Heart Study found that although there was no significant association for CHD deaths alone, if CHD deaths and MI were analysed together there was a significant inverse relationship (Kagan *et al*. 1981), caused by MI alone (Yano *et al*. 1977).

The Auckland Community Study found a negative association with a U-shaped curve for MI incidence (Jackson *et al*. 1991) and the Health Professionals follow-up survey (Rimm *et al*. 1991) found a significant dose-response relationship for coronary heart disease, which remained when excluding current non-drinkers, past heavy drinkers, and men with disorders potentially related to CHD at enrolment. Additional analysis of the Auckland Community data demonstrated a significant negative association between alcohol consumption in the previous 24 hours and risk of MI (Jackson *et al*. 1992).

Three further papers look at the incidence of MI alone. The Finnish Study (Suhonen *et al*. 1987) found a significantly increased risk of MI for abstainers. A non-significant negative association was found in the prospective Puerto Rico Heart Health Programme Study of 8907 men aged 35-79 followed-up for 8 years (data adjusted for age, smoking, exercise, and place of residence) (Kittner *et al*. 1983) and in a case-control study (Scragg *et al*. 1987) of 439 men aged 35-64.

Women In women there are two such studies (Stampfer *et al*. 1988b; Jackson *et al*. 1991). The Nurses' Health Study (Stampfer *et al*. 1988b) which considered a combination of CHD deaths (including sudden coronary death) and incident cases of MI and angina reported a significant inverse dose-response relationship. Data are adjusted for the effects of menopausal status, family history, hormone use, smoking, blood pressure, diabetes mellitus, serum cholesterol, cholesterol intake, age, body mass index, exercise, and intake of saturated and unsaturated fats. The Auckland Community Study (Jackson *et al*. 1991) found a significant negative association for incidence of MI, without a trend, and as with the men, demonstrated a significant negative association between alcohol consumption in the previous 24 hours and risk of MI (Jackson *et al*. 1992).

Men and women A case-control study of 402 men and women aged 40-69 (Stason *et al.* 1976) showed a significantly lowered risk of non-fatal MI for drinkers of more than about 72 g/day.

Sudden coronary death

Men The Finnish prospective study (Suhonen *et al.* 1987) showed a dose-response relationship which was strongest in older men, for which spirit-drinking was responsible. There were 87 cases of sudden coronary death in this period. Adjustment is made for age, smoking, cholesterol level, and blood pressure. The Puerto Rico prospective study (Kittner *et al.* 1983) showed a non-significant increased relative risk for drinkers compared to non-drinkers for sudden coronary death which contrasted with

a non-significant relative risk for other deaths from CHD. This study is adjusted for the effects of age, smoking, exercise, and place of residence, but not for blood pressure. The case- control study of Scragg *et al.* (1987) of 152 men aged 35-64, adjusted for the effects of age, smoking, and blood pressure showed a decreased risk for all drinkers, but numbers were too few for statistical significance.

Women The latter workers found a similar decreased risk in women but numbers were again too small (Scragg *et al.* 1987).

Men and women A cross-sectional study from New Zealand (Fraser & Upsell 1981) of a random sample of 311 men and women with either acute MI or sudden coronary death selected from a community-based register of acute coronary events over a one-year period showed a significant dose-response relationship between alcohol intake and the risk of death from an acute coronary event. Data were adjusted for season, gender, age, prodromal cardiac symptoms, race, smoking, medication, height, weight, ECG features, and autopsy findings.

The authors of the Framingham Study (Gordon & Doyle 1987) comment that "the indication from several studies that drinking may increase the risk of sudden death is somewhat disquieting. The Framingham study itself, while conclusive on this point, does raise the possibility that sudden death not preceded by definite clinical evidence of coronary heart disease may occur more frequently than average among heavy drinkers, as well as among non- drinkers".

Summary

The relationship between level of alcohol consumption and the risk of CHD incidence and death is not consistent. Of 14 reports in men, seven demonstrated a significant negative association (Boffetta & Garfinkel 1990; Hennekens *et al*. 1978; Gordon & Kannel 1983; Gordon & Doyle 1987; Jackson *et al*. 1991; Scragg *et al*. 1987; Rimm *et al*. 1991) (Figure 2.8), three a non-significant negative association (Kono *et al*. 1986; Yano *et al*. 1977; Kittner *et al*. 1983), one no relationship (Shaper *et al*. 1987), and three a non-significant positive association (Dyer *et al*. 1980; Suhonen *et al*. 1987; Camacho *et al*. 1987) (Figure 2.9) between alcohol consumption and risk of CHD.

Of four reports in women, three demonstrated a significant negative association (Stampfer *et al*. 1988b; Gordon & Kannel 1983; Jackson *et al*. 1991) and one no relationship (Camacho *et al*. 1987) (Figure 2.10).

The effect is present across all age ranges although it appears stronger for older people (Shaper *et al*. 1994) and is present for both men and women. Because CHD is rare in premenopausal women and in men under the age of 35 years, the protective effect cannot be of importance among these groups. In two studies, the negative association appeared to be stronger for CHD incidence, than death (Klatsky *et al*. 1981; Rimm *et al*. 1991), although this was not the case in a third study (Shaper *et al*. 1994). The protective effect is specific to CHD and not to other causes of death apart from non- haemorrhagic stroke and persists throughout the total length of follow-up periods (Boffetta & Garfinkel 1990; Friedman & Kimball 1986) which has varied from 2 years (Rimm *et al*. 1991) to 22 years (Gordon & Kannel 1983). Although the protective effect is present across populations from many different countries, most studies have been undertaken in populations in economically developed countries, and the effect in lesser

developed countries is not known. The protective effect appears to be present for all beverage types (Renaud *et al*. 1993).

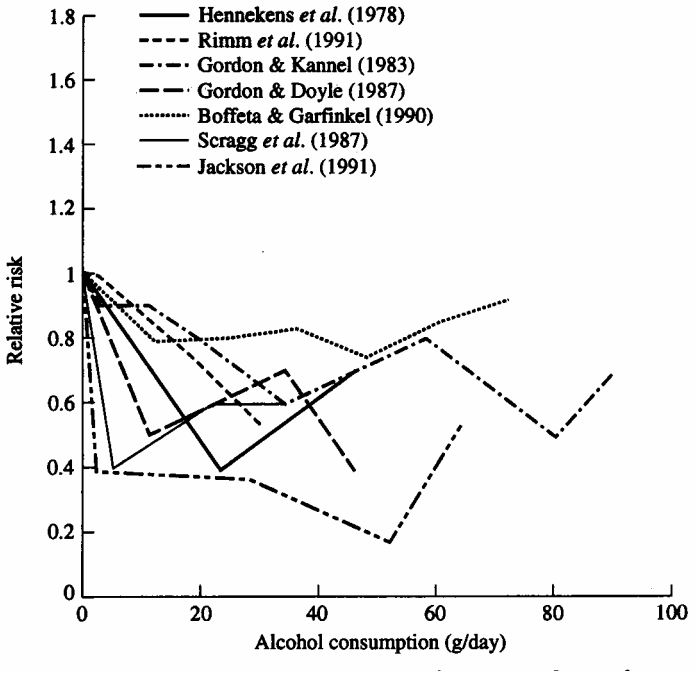

Figure 2.8 Alcohol consumption and incidence of coronary heart disease in men. Data from seven studies with significant negative association.

The protective effect is greater when alcohol consumption is spread throughout the week on a regular basis than when consumption is concentrated and consumed on one occasion during the week (Rimm *et al*. 1991). The Finnish prospective study showed a dose-response relationship for sudden coronary death and a positive dose-response relationship for CHD in older age groups which resulted from the weekend consumption of spirits (Suhonen *et al*. 1987). The reduced risk is achieved at very low doses of alcohol consumption and is similar for consumption ranging from a few grams of alcohol per day to about 40 g per day (Figure 2.8) (Maclure 1993).

Some studies have shown an increased risk of CHD at consumption levels of over 60 g a day (Figure 2.9). Not only former drinkers, but also total abstainers, have a higher incidence of CHD than moderate drinkers (Kono *et al*. 1986; Yano *et al*. 1977; Jackson *et al*. 1991; Klatsky *et al*. 1989; 1990b). However, in one of these studies, former drinkers had a greater incidence of death from CHD than lifetime non-drinkers (Yano *et al*. 1977) and data from the Alameda Cohort study suggested that, at least for women, some of the increased risk of death from ischaemic heart disease associated with not drinking seemed to be accounted for by higher risks among those who gave up drinking (Lazarus *et al*. 1991). A higher risk in non-drinkers has been found in both Japanese Americans of whom 47 per cent of men were non-drinkers (Yano *et al*. 1977)

and British civil servants, of whom 6 per cent of men were non-drinkers (Marmot *et al.* 1981).

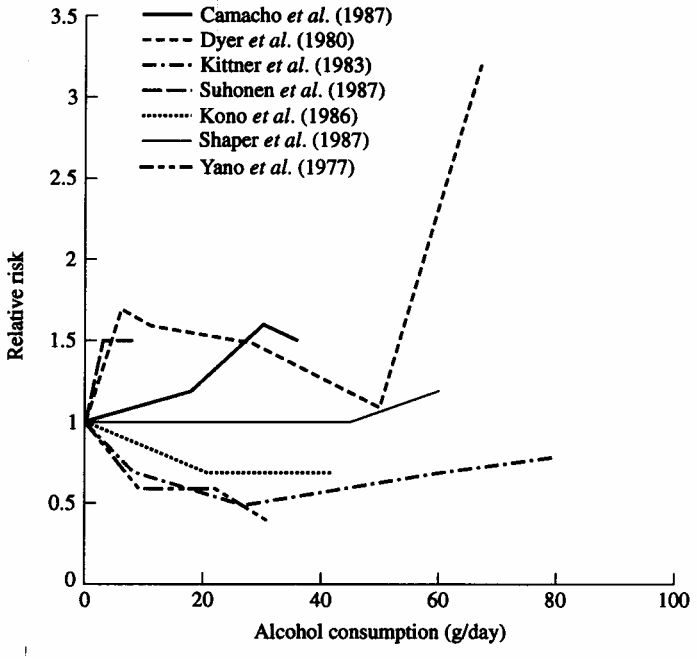

Figure 2.9 Alcohol consumption and incidence of coronary heart disease in men. Data from seven studies with no significant association.

The reduced risk of CHD from moderate alcohol consumption remains when those with cardiovascular illness or risk factors at enrolment are removed from the analysis (Boffetta & Garfinkel 1990; Klatsky *et al.* 1989), although not all studies have demonstrated this (Shaper *et al.* 1994). The reduced risk of CHD is most pronounced for current cigarette smokers (Shaper *et al.* 1994) and the greatest risk is found amongst non-drinkers who smoke (Klatsky *et al.* 1981a; Klatsky *et al.* 1981b; Friedman and Kimball 1986; Marmot *et al.* 1981; Dyer *et al.* 1977). A smoker who is a non-drinker is likely to be a former drinker and a never drinker who is a non-smoker is likely to be a lifelong abstainer (Kozlowski & Ferrence 1990). The reduced risk of CHD is most apparent in manual, as opposed to non-manual workers (Shaper *et al.* 1994).

All cause mortality

Men Of 11 prospective studies of middle-aged men, eight showed a significant association (Figure 2.11), of which seven showed a J-shaped curve (Kagan *et al.* 1981; Boffetta & Garfinkel 1990, Klatsky *et al.* 1981a; Klatsky *et al.* 1981b, Shaper *et al.* 1988; Dyer *et al.* 1980; Kittner *et al.* 1983; Marmot *et al.* 1981).

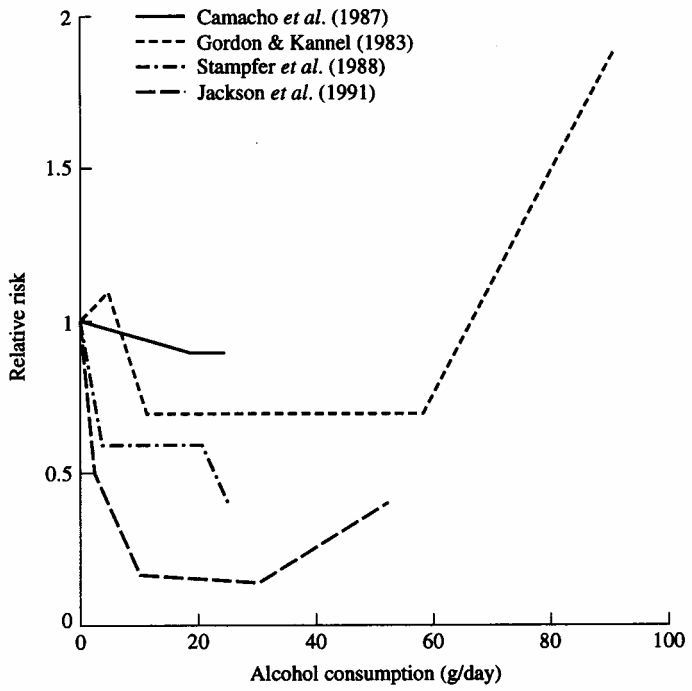

Figure 2.10 Alcohol consumption and incidence of coronary heart disease in women. Data from four studies.

These are the Chicago Western Electric Study (Dyer *et al.* 1980) of 1832 American men aged 40-55 followed-up for 17 years, the Honolulu Heart Study (Kagan *et al.* 1981) of 7591 Japanese men aged 45-69 living in Hawaii followed for 9 years, the Whitehall Civil Servants Study (Marmot *et al.* 1981) of 1422 British men aged 40-64 followed-up for 10 years, the Puerto Rico Heart Health Program (Kittner *et al.* 1983) of 8907 Puerto Rican men aged 35-79 followed-up for 12 years, the British Regional Heart Study (Shaper *et al.* 1988) of 7735 British men aged 40-59 followed-up for 7.5 years, the American Cancer Society Prospective Study (Boffetta & Garfinkel 1990) of 276,802 American men aged 40-59 followed-up for 12 years, and the Kaiser Permanente Study (Klatsky *et al.* 1981a; Klatsky *et al.* 1981b) of 6336 American men aged 15-79 followed-up for 10 years. The eighth study, the Male Japanese Physicians cohort (Kono *et al.* 1986) of 5477 Japanese physicians followed-up for 19 years showed a significantly increased risk for heavy drinkers, but no decreased risk at lower levels.

Further analysis of data from the Chicago Western Electric Study, the Whitehall Civil Servants Study, the British Regional Heart Study, and the Kaiser Permanente Study (Kozlowski & Ferrence 1990) demonstrate that the U-shaped relationship is only apparent among current smokers, particularly heavy smokers (Marmot *et al.* 1981) or ex-smokers (Shaper 1990a). In the Chicago Western Electric study, the U-shaped curve derives almost completely from the former drinkers who smoke cigarettes (Dyer *et al.* 1977), and in the British Regional Heart Study, shows excess deaths only among non-drinking ex-smokers (Shaper 1990b).

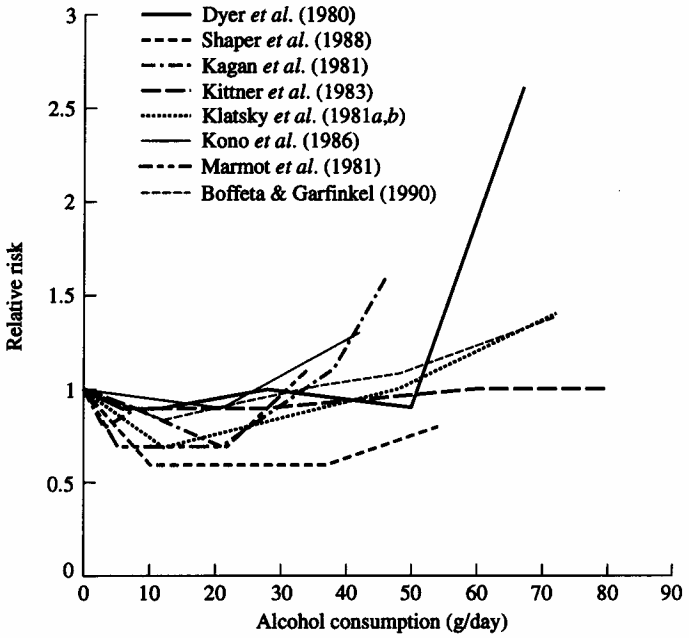

Figure 2.11 Alcohol consumption and incidence of mortality in men from all causes. Data from eight studies with significant association.

The remaining three studies showed a non-significant relationship (Gordon and Kannel 1984; Suhonen *et al*. 1987; Gordon and Doyle 1987) (Figure 2.12). These are the Finnish Social Insurance Institution's Mobile Clinic Health Survey (Suhonen *et al*. 1987) of 4532 Finnish men aged 40-64 followed-up for 5 years, the Framingham Study (Gordon & Kannel 1983) of 2106 American men aged 29-62 followed-up for 22 years, and the Albany study (Gordon & Doyle 1987) of 1910 American men aged 38-55 followed-up for 18 years and 979 men aged 56-73 followed-up for 10 years. In the Finnish study, Suhonen *et al*. (1987) demonstrate a significantly increased risk for coronary death and a significant inverse relationship for MI deaths despite an overall non-significant trend. The Framingham and Albany studies show a significant linear or U-shaped association for non-CHD deaths and a significant inverse association for CHD deaths, despite an overall non-significant relationship with cardiovascular disease mortality. The British Regional Heart data (Shaper *et al*. 1988) demonstrated that the U-shaped curve for total mortality applied only to 'unhealthy' men.

A 15-year follow-up of 11600 adults drawn from the US National Health and Nutrition Examination study, which controlled for the effects of education, smoking status, body mass index, blood pressure, serum cholesterol, and percentage of total calories from fat, demonstrated a significant linear relationship between alcohol consumption and all-cause mortality for females and males under 60 years of age and a non-significant U-shape for older people. The exclusion of persons with heart disease history at baseline led to a more pronounced linear relationship for both females and males under 60 years of age (Rehm & Sempos 1995).

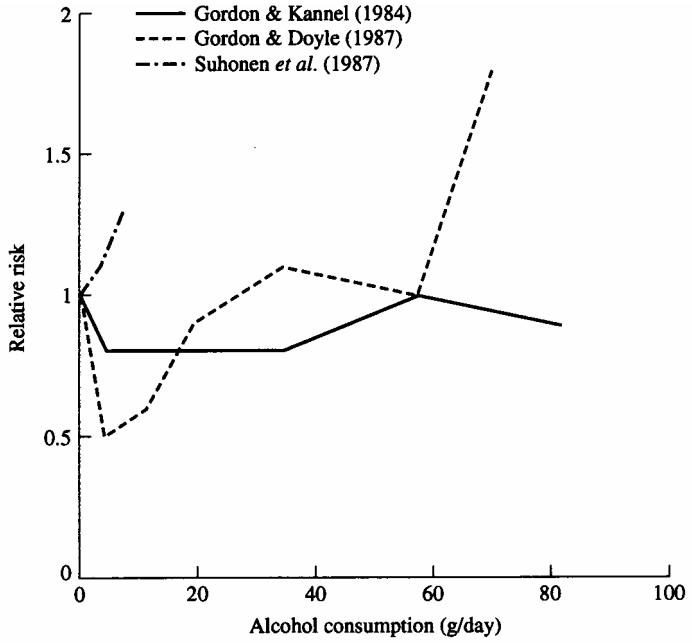

Figure 2.12 Alcohol consumption and incidence of mortality in men from all causes. Data from three studies with no significant association.

The association between alcohol consumption and 15-year mortality of young men was studied in a cohort of 49,464 Swedish conscripts, mostly aged 18-19 (Andreasson *et al*. 1988) (Figure 2.13). Violent death accounted for three-quarters of all deaths and increased in a linear dose-response relationship with increasing alcohol consumption. A U-shaped curve for total mortality was not confirmed, although when violent deaths were excluded, a U-shaped curve was suggested for other causes of death.

Women The relationship between alcohol consumption and mortality was either not significant in the Framingham Study (Gordon & Kannel 1984) of 2641 women aged 29-62 followed-up for 22 years, or exhibited a U-shaped curve in the Kaiser Permanente Study (Klatsky *et al.* 1981a; Klatsky *et al*. 1981b) of 1724 women aged 15-79 within a 10-year follow-up.

Men and women Two further surveys showed a significant U-shaped curve (Camacho *et al*. 1987; Colditz *et al*. 1985). The Alameda Cohorts Study of 1845 men and 2225 women aged over 34, with a 15-year follow-up, divides the group into men and women and shows that the significant U-shaped curve is seen in men, but a non-significant relationship is seen in women (Camacho al. 1987). Colditz *et al*. (1985) followed-up 1184 American men and women aged over 65 for 4.75 years and showed a U-shaped curve in an elderly cohort, but give no separate data for men and women.

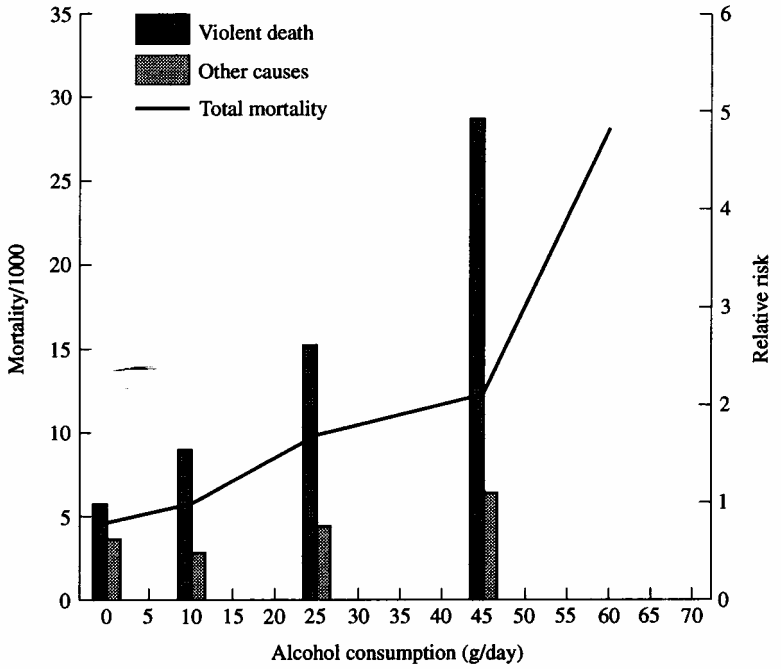

Figure 2.13 Alcohol consumption and incidence of alcohol-induced mortality in young men aged 18-19.
Source: Andreasson *et al.* (1988).

DISCUSSION

Summary of the findings

This chapter has focused on the relationship between alcohol consumption and certain forms of physical harm that are of public health importance, including cirrhosis of the liver, cancers, and cardiovascular disease. This review has not considered alcohol-related causes of violent death which is of great concern among the young and forms an important fraction of potential years of life lost.

Despite numerous methodological problems the similarity of results from different studies is the most convincing evidence that the observed associations are not artefactual, and for many conditions, there is evidence for a dose-response relationship between alcohol consumption and risk, without evidence of a threshold effect. This applies to cirrhosis of the liver, cancers of the pharynx, larynx, liver, female breast, and possibly colorectum, blood pressure, and stroke. There appears to be a significant negative association that is not dose-related, between alcohol consumption and risk of coronary heart disease. It appears that much of the protective effect can be achieved at consumption levels of less than 10 grams of alcohol (one drink) daily and the protective effect cannot be important for men under the age of 35 years and premenopausal women. The relationship between alcohol consumption and total mortality appears largely J-shaped.

In general, more data exists for men than for women. Clinical (Turner *et al.* 1984) and biochemical (Hill 1984) data suggests that women may be more susceptible

to the toxic effects of alcohol than men. However, the risk function curves for women are, with the exception of cirrhosis of the liver, similar to those for men.

Less data is available concerning age differences. In younger men and women, the dose-response relationship for total mortality appears more linear (Andreasson *et al.* 1988, Rehm and Sempos 1995). Insufficient data exists concerning populations with widely different incidence and prevalence rates of disease. There appears to be no substantial beverage differences in the dose-response relationships.

Little information is available concerning drinking patterns. This is particularly important because the number of drinks per day reported in many studies rarely refers to the actual drinking pattern, but to averages of various other measures of consumption such as usual consumption, very recent consumption or consumption at the beginning of the study. Little information is available concerning social integration and mental health, both of which could be important confounders in the relationship between alcohol consumption and total mortality.

The measurement of alcohol consumption

Methods of determining levels of drinking included direct interviews, with or without independent confirmation, self-completed questionnaires, and data taken from medical notes. A few workers attempted to assess lifetime exposure but most enquired about drinking over the past month, year or five years. However, since most physical harm is likely to be due to long-term alcohol use it is important to make some assessment of lifetime drinking. The obvious question: 'How long must I drink at this level to put myself at how much risk?' cannot be answered by available data. Many prospective studies have not been designed to provide information about the risks associated with alcohol; this partly accounts for lack of detailed consumption data.

Different methods have been used to measure alcohol consumption, including quantity frequency questionnaires and diary methods (Duffy 1992b). In the quantity frequency questionnaire, respondents are asked about their drinking of each of three types of alcoholic beverages, beer, wine, and spirits. For each beverage type, the usual frequency of drinking over a one month, three month, or other time period is recorded. The usual quantity of each beverage type drunk on each occasion is also noted. Although quantity frequency questionnaires are commonly used, there are difficulties with their interpretation. First, it is not all together clear how respondents understand the questions, which seem to require the reporting of the most common frequencies and quantities rather than the averages which may be greater. A second difficulty concerns respondents being restricted to the response categories listed in the questionnaire. Under-reporting in this instance is best allowed for by providing very high response categories.

A second method to measure alcohol consumption is to use the diary method based on consumption during a specified number of days of the week prior to interview (Duffy 1992b). The main difficulty of this approach relates to variabilities in individual consumption. For example, if week-to-week variation in the amount of alcohol consumed is relatively large, then the ordering of individuals by reported alcohol consumption using this method will not reflect their ordering over a longer time period. This could have the effect of giving false information on the association between

consumption and outcome variables and the magnitude of the association. In particular, the risk in the consumption categories relative to the zero consumption category will be biased towards a relative risk of 1.0. These biases will be exaggerated, the shorter the time period used for description of drinking occasions.

Measurement differences can also affect the comparison of results between different studies (Duffy 1992b*)*. Differences in response biases or under-reporting between studies, as might occur when analyzing studies from different countries, can lead to different descriptions and sizes of the dose-response relationship. A difference in the description of the dose-response relationship is particularly likely to be found in studies using different measurement methods in countries which show appreciable temporal variation in levels and patterns of individual drinking. Quantity frequency measurements are less likely to be affected by within-individual temporal variation than last week's diary method of consumption and so should produce a more stable ordering of individuals by their consumption level, with less misclassification.

The under-reporting of consumption by individuals, that is known to occur in population surveys, has considerable implications for epidemiological studies (Duffy 1992b*)*. In general, relationships between alcohol consumption and the risk of harm will be 'too steep'. In other words, the level of risk associated with a particular amount of alcohol consumption will, in fact, correspond to a greater amount of alcohol consumption. The observed level of risk is associated not so much with consuming a particular amount of alcohol, but with the reporting of the consumption of that amount. Many studies have used drinking status at the start of a prospective study and have used this as an indicator of subsequent exposure to alcohol. Very few studies provide information on drinking at more than one or two points in time. This is not only important when there are changes in the use of alcohol with age but also when there are temporal differences as a population changes its overall consumption. As alcohol consumption tends to decrease with increasing age, epidemiological studies based on the baseline measurement, would tend to lead to an underestimation of risk.

Assumptions about the alcohol content of the reported number of drinks and the need to convert data to grams of alcohol per day introduce further areas of difficulty. And lack of information about previous drinking among 'non- drinkers' is of particular importance in relation to discussion of the protective effect of alcohol. This also requires an accurate smoking history, because a non-drinking smoker is much more likely to be an ex-drinker than a lifelong abstainer and a non-drinker who never smoked is much more likely to be a life-long abstainer than an ex-drinker (Kozlowski & Ferrence 1990). There are difficulties in converting data to alcohol consumption per day, since in many studies, drinking patterns or frequencies rarely refer to actual patterns of drinking but to averages of various levels (Knupfer 1987). There is, of course, a huge difference between a pattern of drinking consisting of two drinks every day and one consisting of 14 drinks on one day. Even when good measures of quantity and frequency are obtained, most researchers do not control for body weight and composition, and this could lead to further distortions.

The epidemiology of risk

A review of published papers may be biased by the greater likelihood of publication of those which demonstrate an association between alcohol and harm (Simes 1986). Comparison between studies is complicated by a number of factors. Most papers reviewed are in the English language but they come from many different countries and involve a variety of racial groups; it is well known, for example, that the Japanese display genetic variations in their ability to metabolize alcohol (Goedde & Agarwal 1989). Numbers of patients in studies vary, and are often too small to draw definite conclusions; diseases are rarely classified according to International Classification of Diseases (ICD) standards. Studies may be either prospective, case-control, or cross-sectional. Prospective surveys have variable lengths of follow-up and use different end-points, such as death, incidence, prevalence, hospitalization, or a confusing mixture of these. Confounding effects may or may not be controlled for, and different methods are used for doing so. This is particularly important with relation to cigarette smoking, which is so closely interrelated with alcohol consumption. Matching in case-control studies involving both drinking and smoking can be difficult and statistical adjustment of tobacco use could be misleading. It may be better to present results separately for smokers and non-smokers. This is particularly so when smoking rates are declining in many of the countries in which the studies were undertaken.

In some studies, the results of controlling for confounders have provided values of the estimates of the association after adjustment, although this is not always the case (Duffy 1992c). Case-control studies vary in the selection of controls; use of hospital controls, for example, may introduce bias because potential alcohol-related disorders are common in such a population. The strength of the approach adopted in existing reviews provides a basis for causal inferences, because of the strength of association, the presence of a dose-response relationship, the temporal relation between risk, and exposure and consistency across different studies. It is often the case that studies relating alcohol consumption to a specific disease are undertaken by different groups of researchers in different countries at different times. When consumption and outcome data are available from relevant studies in similar forms, it is usually quite simple to compare and, if appropriate, combine the results. If, however, there are significant differences in the relationship between consumption and risk in the different studies, it is best not to attempt to provide a combined risk estimate, although for practical purposes it may be necessary to do so. It is, however, possible to conclude that alcohol is associated with a disease if all the odds-ratio estimates of different studies are in the same positive direction. If the interaction between the study and alcohol consumption is not statistically significant, then it can be concluded that all the studies are indicating the same relationship between alcohol consumption and the disease, and it is then legitimate to produce a single estimate.

If not given, the relative risk (RR) can be calculated from the crude data (Duffy1992c). In cohort studies, the relative risk can be calculated as the ratio of the rate among those exposed to alcohol to the rate among the unexposed. Relative risk measures how much more or less likely it is that disease occurs among those exposed to the factor in question. The odds ratio is another measure of association. Given the rates of illness, which may be considered as probabilities of illness, the odds for the exposed

and unexposed groups can be calculated. The odds ratio may be estimated in situations, such as case-control studies and matched case-control studies where neither the rate difference nor the relative risk can be calculated. The odds ratio approximates the relative risk if the incidence rate of the disease is small. An alternative method of analyzing such studies is provided by logistic regression which postulates a linear regression of log-odds of illness risk on values of the exposed variable. Logistic linear models provide an estimate of the regression coefficient relating how the log-odds ratio of a particular condition increases (or decreases) with increasing alcohol consumption. In most papers, non-drinkers are used as a baseline with a relative risk of 1.0; where moderate drinkers are used relative risk can be recalculated using non-drinkers as the baseline where possible.

CONCLUDING REMARKS

For the adult population, it is possible to give an estimate of risk in relation to reported levels of alcohol consumption for the conditions reviewed in this chapter. At levels of reported consumption of around 20 grams of alcohol (two drinks) a day, compared with no consumption, it has been estimated that there is a twofold increased risk for cirrhosis of the liver (Duffy 1992a*),* a 20-30 per cent increased risk for cancers of the oral cavity, pharynx, and larynx (Duffy & Sharples 1992), a 10 per cent increased risk for cancer of the oesophagus (Duffy & Sharples 1992), a 14 per cent increased risk for cancer of the liver (Duffy & Sharples 1992), a 10-20 per cent increased risk for cancer of the female breast (Holman & Armstrong 1990; Duffy & Sharples 1992), an increase in blood pressure of between 2 and 4 mmHg, and possibly a 20 per cent increased risk of stroke (Holman & Armstrong 1990). However, at these levels of consumption, for some segments of the population, the increased risk is balanced by a decreased risk of coronary heart disease of approximately 25-50 per cent (Renaud *et al.* 1993; Marmot & Brunner 1991). Consequently, at levels of reported intake of around 20 grams of alcohol (two drinks) a day, the relative risk of total mortality is not increased. Above levels of consumption of 20-30 grams of alcohol (two to three drinks) a day, compared with abstainers, there is a net increase in risk of death.

The 1993 publication reported in this chapter was one of the first attempts to review and describe the dose-response relationships between alcohol consumption across a wide range of harms (Anderson *et al*. 1993). The findings, which were not the object of meta-analyses, confirmed the appropriateness of the then existing guidelines on upper limits of lower risk drinking. The extent to which the findings continue to hold ten years later will be the subject of Chapter 3, which will extend the evidence base by referring to subsequent reviews and meta-analyses, will discuss the importance of the patterns of drinking as well as the volume of alcohol consumption in relation to the risk of alcohol, including social harm and intentional and un-intentional injuries, will consider the relationship between alcohol and risk of breast cancer and will return to the question as to whether or not alcohol reduces the risk of coronary heart disease.

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CHAPTER 3

THE RISK OF ALCOHOL: AN UPDATE TEN YEARS ON[1]

ABSTRACT

Aims To identify if the findings of the review undertaken during the early 1990s and published in chapter 2 hold ten years on; to consider, the importance of patterns of drinking as well as the volume of alcohol consumption in relation to the risk of alcohol, including social harm and intentional and unintentional injuries, to consider the relationship between alcohol and the risk of breast cancer and to return to the question as to whether or not alcohol reduces the risk of coronary heart disease.

Methods Identification of thirty eight major reviews through the references of key texts and publications.

Findings Reviews and meta-analyses of high quality studies have provided stronger evidence for the relationships between alcohol consumption and harm, at both the individual and at the population level. Five additional reviews and meta-analyses have confirmed the risk of alcohol consumption for female breast cancer, which cannot be explained by confounding of known risk factors. It is estimated that in high income countries, the cumulative incidence of breast cancer by age 80 years increases linearly from 88 per 1000 women in non-drinkers to 133 per 1000 women consuming a reported average of six alcoholic drinks each day. A systematic review found a clear relationship between recent and chronic use of alcohol and the risk of stroke, with no clear evidence of a protective effect on the risk of ischaemic stroke. Consumption of a high volume of alcohol in a short period of time increased the risk of myocardial infraction, sudden coronary death and stroke. Although meta-analyses have confirmed that alcohol can reduce the risk of coronary heart disease, the relationship was not consistent across all studies, the risk of coronary heart disease increased at higher levels of alcohol consumption, and concerns remained about the role of confounding variables. In particular, wine drinkers appeared to have overall healthier lifestyles than non-wine drinkers and non-drinkers appeared to have overall less healthy lifestyles than drinkers in general. The size of the reduction in risk for coronary heart disease was both smaller and occured at a lower level of alcohol consumption than previously considered. The importance of patterns of drinking, as well as the volume of alcohol consumption, for the risk of alcohol-related harm has been stressed for intentional and unintentional injuries and the social consequences of alcohol consumption.

[1] Based on Anderson, P., Alcohol Use Disorders. In Hosman, C., Jané-Llopis, E., & Saxena, S., eds. (In press). *Prevention of mental disorders: An overview on evidence-based strategies and programs*. Oxford, Oxford University Press.

Conclusions In populations with high rates of coronary heart disease, which demonstrate a J or U shaped relationship between alcohol and risk of total mortality, the lowest risk for total mortality (nadir) was found to occur at reported levels of alcohol consumption of 10 g/day for men and somewhat less for women, a level lower than previously considered. The nadir was zero at younger ages and increased with increasing age. Alcohol policy which results in a reduction in alcohol consumption will also result in a net reduction in harm.

Note to the reader The detailed and technical content of this chapter is summarized in Box 3.2 on page 62. Readers who wish to avoid the detail, without missing out on the main findings of the chapter are referred to this box.

INTRODUCTION

Studies undertaken during the early 1990s took a new approach to the relationship between alcohol consumption and harm, producing risk curves to describe the dose-response relationships (Duffy 1992; Anderson *et al*. 1993; Anderson 1995; see chapter 2). The purpose of the present chapter is to consider the robustness of the findings ten years on. The importance of the patterns of drinking as well as the volume of alcohol consumption in relation to the risk of alcohol, including social harm and intentional and unintentional injuries will be discussed. The relationship between alcohol and risk of breast cancer will be considered. And the question as to whether or not alcohol reduces the risk of coronary heart disease will be reviewed.

Breast cancer affects up to 10% of women in high income countries; it is not easily preventable, and if there is an association between alcohol consumption and the risk of breast cancer, even if small, this could have important implications for public health. Although there is strong evidence that alcohol reduces the risk of coronary heart disease and possibly ischaemic stroke, considerable concern remains about the role of confounders, the size of the potential reduction of risk and the level of alcohol consumption at which the reduced risk might be gained. In the estimates of disability adjusted life years, alcohol is found to be a more important cause of disability than premature death. It is important therefore to further clarify the nature of the dose response relationships between alcohol and the risk of social harms, intentional and unintentional injuries, including the importance of patterns of drinking. The implications of the dose-response relationships found between alcohol and risk of harm for alcohol policy will be considered.

METHODS

Reviews and meta-analyses of the relationships between alcohol consumption and risk of harm were identified through the references of key texts (Heather *et al.* 2001; Babor *et al.*, in press), publications in the journals Addiction and Drug and

Alcohol Review, and the alcohol list serve of the Institute of Alcohol Studies (www.ias.org.uk). The reviews and meta-analyses and their key references were obtained. Information was abstracted from the published papers with particular reference to the robustness of the findings of the 1993 review (Anderson *et al.* 1993; see Chapter 2), and the relationships between alcohol consumption and breast cancer, cardiovascular diseases and intentional and unintentional injuries and social harms. For ease of understanding a number of figures and tables from these reviews have been reproduced. Athough alcohol increases the risk of neuro-psychiatric disorders (Knight 2001; Greenfield 2001), muscle, skin and bone diseases (Preedy et al. 2001), nutritious and infectious diseases (Estruch 2001), harm to the foetus (Knight 2001) and a wide range of violent and criminal behaviour (Graham & West 2001), such harms are not the subject of the present review.

RESULTS

Thirty eight major reviews and meta-analyses were identified, Box 3.1. Six referred to the risk of alcohol in general; five referred to the risk of breast cancer; eighteen referred to the risk of cardiovascular disease; two referred to the risk of social harms and intentional and unintentional injuries; and nine referred to aggregate time series studies. The results are summarized in Box 3.2.

Box 3.1 Indentified individual studies and reviews and meta-analyses.

Six with reference to the risk of alcohol in general
English *et al.* 1995; Corrao *et al.*1999; Doll *et al.* 1999*; Rodes *et al.* 1999*; Tabakoff *et al.* 1999*; White 1999.

Five with reference to the risk of breast cancer
Longnecker 1994; English *et al.* 1995; Smith-Warner *et al.* 1998; Corrao *et al.* 1999; McPherson *et al.* 1999*; Collaborative Group on Hormonal Factors in Breast Cancer 2002.

Eighteen with reference to the risk of cardiovascular disease
Anderson 1998; Criqui 1998; Gaziano & Buring 1998; Hendriks & van der Gaag 1998; Hillbom *et al.* 1998; Keil *et al.* 1998; Kupari & Koskinen 1998; Puddey *et al.* l998; Puddey *et al.* 1999; Rehm & Bondy 1998; Renaud & Geuguen 1998; Richardson *et al.* 1998; Shaper & Wannamethee 1998; Grobee *et al.* 1999*; Corrao *et al.* 2000; Fillmore 2000; Rehm 2000; Mazzaglia *et al.* 2001.

Two with reference to the risk of social harms and intentional and unintentional injuries
Gruenewald *et al.* 1996; Rehm *et al.* 1996.

Nine with re ference to aggregate time series studies
Kerr *et al.* 2000; Hemstrom 2001; Norstrom & Skog 2001; Norstrom 2001; Ramstedt 2001a; Ramstedt 2001b; Rossow 2001; Skog 2001a; Skog 2001b.

* Reviews funded by the beverage alcohol industry

Box 3.2 The risk of alcohol

Condition	Summary of findings
Cirrhosis of the liver	A meta-analysis of 8 high quality studies demonstrated a dose-response relationship, with at least a doubling of risk at 25g/day. At a given level of alcohol consumption, women were at considerably increased risk compared with men.
Cancers	A meta-analysis of 8 high quality studies of cancers of the lip, oral cavity and pharynx, of 14 high quality studies of cancer of the oesophagus, and of 20 high quality studies of cancer of the larynx found high alcohol-related risks. A meta-analysis of 16 high quality studies of cancer of the colon, of 3 high quality studies of cancer of the rectum, and of 10 high quality studies of cancer of the liver found weaker but significant associations.
Breast cancer	5 meta-analyses found a relationship between alcohol consumption and risk of breast cancer, which cannot be explained by confounding with known risk factors for breast cancer. It is estimated that 4% of breast cancer in high income countries is attributable to alcohol.
Stroke	A systematic review of 41 studies found a clear relationship between both recent and chronic alcohol use and risk of both ischaemic and haemorrhagic stroke, with no clear evidence of a protective effect of light to moderate drinking on the risk of ischaemic stroke. Patterns of high volume drinking occasions were an important risk factor for stroke, also in young people.
Coronary heart disease (CHD)	A meta-analysis of 51 studies and of 28 high quality cohort studies found a 20% decreased risk of CHD at reported consumption levels of 20g/day, with an increased risk at over 89g/day. The size of the reduction in risk for coronary heart disease was both smaller and occured at a lower level of alcohol consumption than previously considered. The reduced risk was greater in men than in women, in men living in rather than outside the Mediterranean area and for non-fatal events rather than fatal events. Estimates of the size of reduction in risk from high quality studies were smaller than those based on all studies. High volume drinking occasions increased the risk of CHD, cardiac arrthymias and sudden coronary death. Although the relationship between alcohol consumption and the risk of coronary heart disease is biologically plausible, concern still remains that the effect or at least some of it might be explained by alcohol measurement problems and confounders that have not been adequately controlled in all studies.
Intentional and unintentional injuries	The risk for intentional and unintentional injuries and the social consequences of alcohol consumption increased with the volume of alcohol consumption, the frequency of high volume drinking occasions, and the volume of alcohol consumed during an occasion.
Total mortality	There is a linear relationship between alcohol and risk of total mortality in populations with low CHD rates (which includes younger people everywhere). There is a J or, among older populations, a U shaped relationship between alcohol and risk of total mortality in populations with high rates of CHD (with the change from linear to a J or U shape occurring at an age of death of 50 to 60 years). The lowest risk for total mortality (nadir) occurs at 10 g/day for men and somewhat less for women, a level lower than previously considered.

The risk of alcohol-related conditions

Summarized adjusted relative risks from a meta-analysis of 123 high quality studies are reproduced in Table 3.1 (Corrao *et al.* 1999). Alcohol related risks with dose-response relationships were found for cancers of the lip, oral cavity and pharynx (8 studies), oesophagus (14 studies), colon (16 studies), rectum (3 studies), liver (10 studies), larynx (20 studies) and breast (20 studies). The risks were higher for cancers of the upper respiratory and digestive tracts than for cancers of the colorectum, liver and breast. Higher alcohol related risks were found for liver cirrhosis (8 studies), weaker associations were found for chronic pancreatitis (2 studies) and no association for gastric and duodenal ulcer (2 studies). Higher alcohol related risks were found for haemorrhagic stroke (9 studies), weaker associations were found for essential hypertension (10 studies) and no associations for ischaemic stroke (6 studies). High alcohol related risks were found for injuries and adverse effects. For all the conditions with an association, increased risks were found to be present at reported consumption levels of 25 g of absolute alcohol per day. The slope of the risk varied by gender and the geographical area in which the study was performed.

For North American men who died between the ages of 35 and 69, the US Cancer Prevention Study II estimated that the absolute risk of death from liver cirrhosis increased from 5 per 100,000 at no alcohol consumption to 41 per 100,000 at 4 or more drinks per day (Thun *et al.* 1997). The absolute risk of death from alcohol-related cancers (mouth, oesophagus, pharynx, larynx and liver), increased from 13 per 100,000 at no alcohol consumption to 37 per 100,000 at 4 or more drinks per day.

Cancer of the female breast

The five additional reviews and meta-analyses (Box 3.1) confirmed the findings of previous reviews (Longnecker *et al*. 1988; Howe *et al*. 1991; Anderson *et al*. 1993) of the relationship between alcohol consumption and the risk of breast cancer (Figure 3.1).

The largest of these was the meta-analysis of the Collaborative Group on Hormonal Factors in Breast Cancer (2002), which combined data on 58515 women with invasive breast cancer and 95067 controls from 53 studies. Compared with women who reported drinking no alcohol, the relative risk of breast cancer was 1.32 (95%CI, 1.19-1.45) for a reported intake of 35 - 44 g of alcohol per day, and 1.46 (95%CI, 1.33-1.61) for 45 g or more of alcohol per day. The relative risk of breast cancer increased by 7.1% for each additional 10 g of alcohol per day. This increase was the same in ever-smokers and never-smokers. The slope of the relationship was not altered when adjusting for 11 potential confounding factors (race, education, family history of breast cancer, age at menarche, height, weight, body mass index, breastfeeding, use of hormonal preparations, and age at and type of menopause) suggesting that the associations between alcohol and the risk of breast cancer are not explained by the known confounding factors.

Table 3.1 Summarized relative risks, and corresponding 95% confidence intervals, for selected doses of alcohol consumption.

Inclusion criteria †						RRp (and 95% CI) for dose of alcohol intake §		
Quality score	Adjustment	Gender	No. Studies	Model ‡: ln RR =	Strata	25 g/day	50 g/day	100 g/day
Malignant neoplasm of lip, oral cavity and pharynx								
⩾14	—	testable	8	$0.03481 \cdot Alc - 1.3 \cdot 10^{-4} \cdot Alc^2 + 2.1 \cdot 10^{-7} \cdot Alc^3 - 0.00673 \cdot (Alc \cdot Area) + 0.00155 \cdot (Alc \cdot Gender)$	Men/Mediterranean	2.2* (1.9, 2.5)	4.2* (3.0, 5.5)	10.7* (4.6, 24.9)
					Women/Mediterranean	2.3* (1.7, 3.0)	4.5* (2.4, 7.7)	12.5* (2.8, 55.4)
					Men/Other areas	1.9* (1.5, 2.3)	3.0* (1.9, 4.8)	5.5* (1.7, 17.0)
					Women/Other areas	1.9* (1.3, 2.8)	3.2* (1.5, 7.1)	6.4* (1.1, 37.7)
					Deviance (37 df) #		197.37**	
					p #		0.0000	
Malignant neoplasm of oesophagus								
—	yes	—	14	$0.01860 \cdot Alc - 7.5 \cdot 10^{-8} \cdot Alc^3 - 0.00276 \cdot (Alc \cdot Area)$	Mediterranean	1.6* (1.5, 1.7)	2.5* (2.2, 2.8)	6.0* (4.6, 7.8)
					Other areas	1.5* (1.3, 1.7)	2.2* (1.7, 2.8)	4.5* (2.6, 7.8)
					Deviance (49 df) #		211.16**	
					p #		0.0000	
Malignant neoplasm of colon								
—	—	—	16	$0.00138 \cdot Alc + 0.01161 \cdot (Alc \cdot Design)$	Case-control studies	1.0* (1.0, 1.1)	1.1* (1.0, 1.2)	1.1* (1.0, 1.3)
					Cohort studies	1.4* (1.1, 1.7)	1.9* (1.3, 2.9)	3.6* (1.6, 8.5)
					Deviance (53 df) #		90.05**	
					p#		0.0012	
Malignant neoplasm of rectum								
⩾13	—	testable	3	$0.00423 \cdot Alc + 0.02824 \cdot (Alc \cdot Gender)$	Men	1.1* (1.0, 1.2)	1.2* (1.1, 1.5)	1.5* (1.2, 2.2)
					Women	2.3* (1.3, 4.0)	5.0* (1.6,16.4)	25.7* (2.5,267.6)
					Deviance (11 df) #		12.60	
					p #		0.3201	
Malignant neoplasm of liver								
⩾11	—	—	10	$0.00743 \cdot Alc - 1.5 \cdot 10^{-5} \cdot Alc^2$	All	1.2* (1.1, 1.3)	1.4* (1.2, 1.6)	1.8* (1.2, 2.6)
					Deviance (30 df) #		77.50**	
					p #		0.0000	
Malignant neoplasm of larynx								
—	—	—	20	$0.01974 \cdot Alc + 1.7 \cdot 10^{-8} \cdot Alc^3 - 0.01169 \cdot (Alc \cdot Area)$	Mediterranean	1.6* (1.6, 1.7)	2.7* (2.4, 2.9)	7.1* (5.8, 18.6)
					Other areas	1.2* (1.1, 1.3)	1.5* (1.2, 1.8)	2.1* (1.4, 3.1)
					Deviance (64 df) #		278.87**	
					p #		0.0000	
Malignant neoplasm of breast								
⩾14	—	—	29	$0.01229 \cdot Alc - 0.00462 \cdot (Alc \cdot Area) +$	Mediterranean	1.4* (1.3, 1.5)	1.8* (1.6, 2.1)	3.4* (2.6, 4.6)
					Other areas	1.2* (1.0, 1.4)	1.5* (1.1, 2.0)	2.2* (1.1, 4.0)
					Deviance (118 df) #		289.56**	
					p #		0.0000	
Essential hypertension								
⩾10	—	—	2	$0.01424 \cdot Alc$	All	1.4* (1.3, 1.5)	2.0* (1.8, 2.3)	4.1* (3.1, 5.9)
					Deviance (7 df) #		27.83**	
					p #		0.0003	

Ischaemic stroke								
—	yes	—	6	$-0.02559 \cdot Alc + +9.8 \cdot 10^{-4} \cdot Alc^2 - -6.7 \cdot 10^{-6} \cdot Alc^3$	All Deviance (17 df) # *p* #	0.9 (0.3,2.4)	1.4 (0.1,43.4) 59.60** 0.0000	1.4 (0.0,999.9)
Haemorrhagic stroke								
—	—	—	9	$0.01500 \cdot Alc$	All Deviance (28 df) # *p* #	1.5* (1.3,1.6)	2.1* (1.8, 2.5) 80.62** 0.0000	4.5* (3.2, 6.3)
Gastric and duodenal ulcer								
—	yes	—	2	$-0.00070 \cdot Alc$	All Deviance (7 df) # *p* #	1.0 (0.8,1.3)	1.0 (0.4, 1.8) 11.77 0.1195	0.9 (0.2, 2.8)
Liver cirrhosis								
⩾14	—	testable	8	$0.03662 \cdot Alc - -4.7 \cdot 10^{-5} \cdot Alc^2 - -0.01716 \cdot (Alc \cdot Area) + +0.00893 \cdot (Alc \cdot Gender) +$	Men/Mediterranean Women/Mediterranean Men/Other areas Women/Other areas Deviance (49 df) # *p* #	2.4* (2.1,2.2) 3.0* (2.1,4.6) 1.6* (1.3,2.1) 2.0* (1.3,3.5)	5.5* (4.0, 7.7) 8.7* (3.9,20.3) 2.4* (1.5, 4.2) 3.7* (1.3, 9.7) 165.69** 0.0000	24.3* (10.3, 52.7) 59.3* (10.7,301.1) 4.4* (1.4, 15.3) 10.7* (1.3, 77.7)
Non-cirrhotic chronic liver diseases								
—	—	—	1	$0.00697 \cdot Alc$	All Deviance (6 df) # *p* #	1.2* (1.1,1.5)	1.4* (1.2, 2.5) 1.89 0.9295	2.0* (1.7, 5.7)
Chronic pancreatitis								
—	—	—	2	$0.01160 \cdot Alc$	All Deviance (8 df) # *p* #	1.3* (1.2,1.5) ##	1.8* (1.3, 2.4) ##	3.2* (1.8, 5.6)
Injuries and adverse effects								
—	yes	—	9	$0.01380 \cdot Alc - -0.0113 \cdot (Alc \cdot Outcome)$	Incident cases Deaths Deviance (25 df) # *p* #	1.4* (1.2,1.6) 1.1* (1.0,1.3)	2.0* (1.5, 2.6) 1.1* (1.0, 1.7) 57.76 0.0000	4.0* (2.4, 6.6) 1.3* (1.0, 3.1)

†Criteria for inclusion of a study in the analysis were: (i) if quality score was > the median value for the specific condition, when quality score showed evidence to modify the effect of alcohol; (ii) if reported adjusted estimates of relative risks, when adjustment showed evidence to modify the effect of alcohol; (iii) if effect of gender was testable, when gender showed evidence to modify the effect of alcohol. ‡Criteria for inclusion of a covariate in the model were: (i) linear and/or quadratic and/or cubic effect of alcohol intake on the risk the condition; (ii) area and/or design and/or outcome and/or gender on the basis of their role in modifying the linear effect of alcohol; among these covariates, only those selected from the model by a backward strategy were reported. § Pooled relative risk, and corresponding 95% confidence interval (CI), directly obtained from the ßp coefficient of the global model, and from the corresponding standard error, respectively. # Residual deviance (and corresponding degrees of freedom and *p* value) of the model. ## One of the two included studies reported only the linear ß coefficient (and the corresponding standard error), thus pre-pool models (and corresponding residual deviances) were not fitted. * Evidence of a relative risk significantly different from 1 based on 95%CI that does not contain the null value ($p<0.05$). ** Significance of the residual deviance ($p<0.05$) indicates that the model did not fit the data.

Reproduced from: Corrao, Bagnardi, Zambon & Arico (1999).

During the early 1990s, the cumulative incidence of breast cancer up to age 80 years was between about eight and 10 per 100 women in high income countries (Parkin *et al*. 1997). If the dose-response relationship described in the Collaborative Group on Hormonal Factors in Breast Cancer (2002) is valid, it is estimated that about 4% of breast cancers in high income countries are attributable to alcohol. In high income countries, the cumulative incidence of breast cancer by age 80 years was estimated to increase from 8.8 per 100 women in non-drinkers to 9.4, 10.1, 10.8, 11.6, 12.4 and 13.3, respectively, per 100 women consuming an average of 1, 2, 3, 4, 5 and 6 alcoholic drinks each day.

Although the results provided no direct evidence about possible mechanisms of carcinogenesis by alcohol on the breast, there is accumulating evidence that regular intakes of moderate amounts of alcohol affect sex hormone levels. For example, the results of a randomised trial of 51 postmenopausal women suggested that sex hormone levels that can be a risk factor for breast cancer may be increased after the consumption of 30 g of alcohol per day for 8 weeks (Dorgan *et al.* 2001), levels of alcohol consumption that are associated with an excess risk of breast cancer.

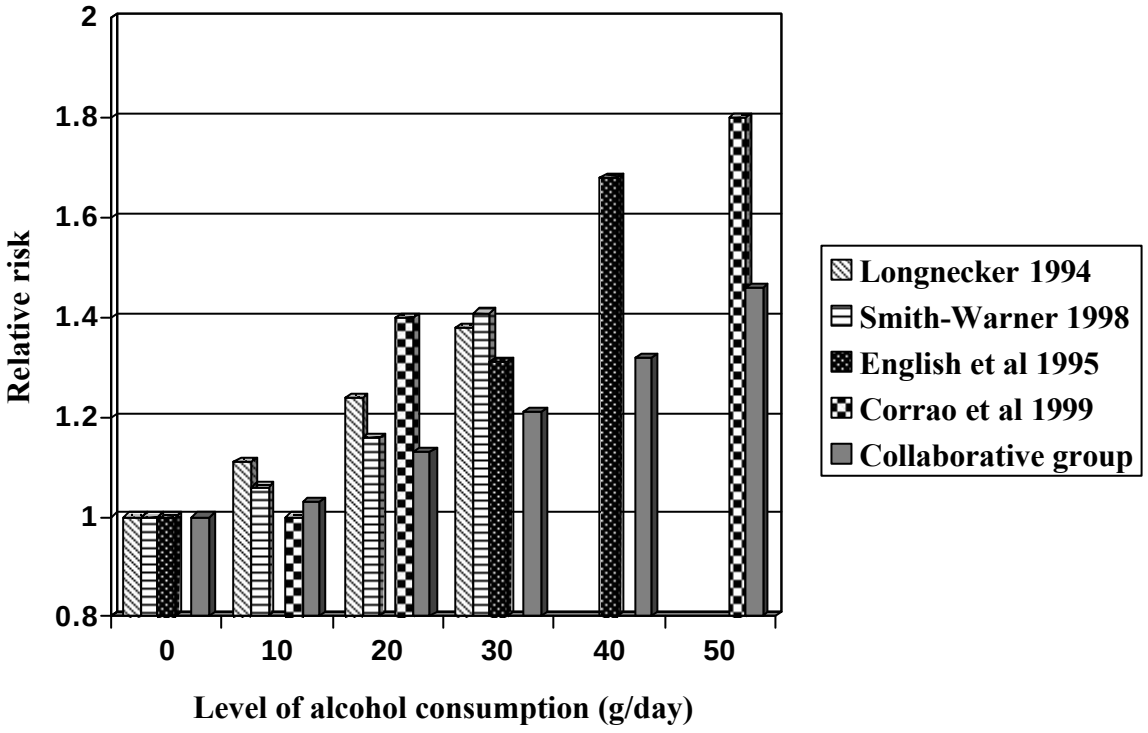

Figure 3.1 Results of five meta-analyses relating alcohol consumption to the risk of female breast cancer.

Cardiovascular disease

Eighteen reviews referred to the relationship between alcohol use and the risk of coronary heart disease, cardiovascular diseases and overall mortality (Box 3.1).

Stroke

Although the review of Corrao *et al.* (1999) found a high alcohol related risk for haemorrhagic stroke, but no association for ischaemic stroke, a much larger systematic review of 41 studies exploring the relationship between alcohol consumption and the risk of non-fatal and fatal stroke, found a clear relationship between recent alcohol use and risk of stroke, both ischaemic and haemorrhagic (Mazzaglia *et al.* 2001). Chronic alcohol intake was also a risk factor for both haemorrhagic and ischaemic stroke, with a dose-response relationship found for haemorrhagic stroke. Although some individual studies in the review found that light drinking reduced the risk of ischaemic stroke, overall there was no clear evidence of a protective effect of light to moderate drinking on the risk of either ischaemic stroke or overall stroke.

Patterns of intake are important for the risk of stroke (Hillbom & Kaste 1983; Wilkins & Kendall 1985). Hillbom & Kaste (1982) compared the percentage distribution of onset of brain infarction on different days with the weekly pattern of alcohol consumption in Finland. Their results showed that 20% of ischaemic strokes in persons less than 40 years of age were alcohol-related, i.e. that the first symptoms of infarction occurred either during alcohol intoxication or within 24 hours of heavy drinking, and this association was particularly strong among adolescents. Alcohol intoxication increased the risk of brain infarction 2-3 times for men and 3-4 times for women. They also found that both ischaemic brain infarction and subarachnoid haemorrhage accumulated on weekends, when heavy drinking was greatest (Hillbom 1987). In a case-control study of 156 young and middle aged men with ischaemic stroke, where both pattern and the estimated average weekly alcohol intake were assessed, heavy alcohol intake (>300 g/week) was associated with a greater than four-fold increased risk of stroke, while regular light-to-moderate drinking (up to 300 g/week) was associated with a 54% reduction in risk (Palomkai & Kaste 1993). This reduction in risk was attenuated if there was an irregular rather than a regular pattern of alcohol consumption. High volume drinking occasions and alcoholic intoxication have also differentiated young stroke patients in other case-control studies (Hillbom *et al.* 1995; Taylor & Combs-Orme 1985; Marini *et al.* 1993).

Coronary heart disease

In a meta-analysis of alcohol and coronary heart disease, Corrao *et al.* (2000) pooled the dose-response functions of 51 studies and of 28 cohort studies with higher quality (Figure 3.2; reproduced from Corrao *et al.* 2000).

The estimates of the degree of protection from high quality studies were smaller than those based on all studies. Studies reporting estimates adjusted for the main risk factors, those excluding ex-drinkers from the non-drinker category and cohort studies excluding subjects with pre-existing disease at the start tended to report lower protective effects of alcohol. Moreover, lower protective effects were noted in the follow-up data than in the case-control data; the former are less subject to bias. Thus, considering only the 28 cohort studies with good qualitative characteristics, the risk of coronary heart disease decreased at reported consumption levels of from 0 to 20 grams (one to two drinks) of alcohol per day (RR=0.80; 95%CI, 0.78-0.83); there was evidence of a protective effect up to 72 grams (about a bottle of wine) of alcohol per

day (RR=0.96; 95%CI, 0.92-1.00); and there was an increased risk above 89 grams (about nine drinks) a day (RR=1.05; 95%CI, 1.00-1.11).

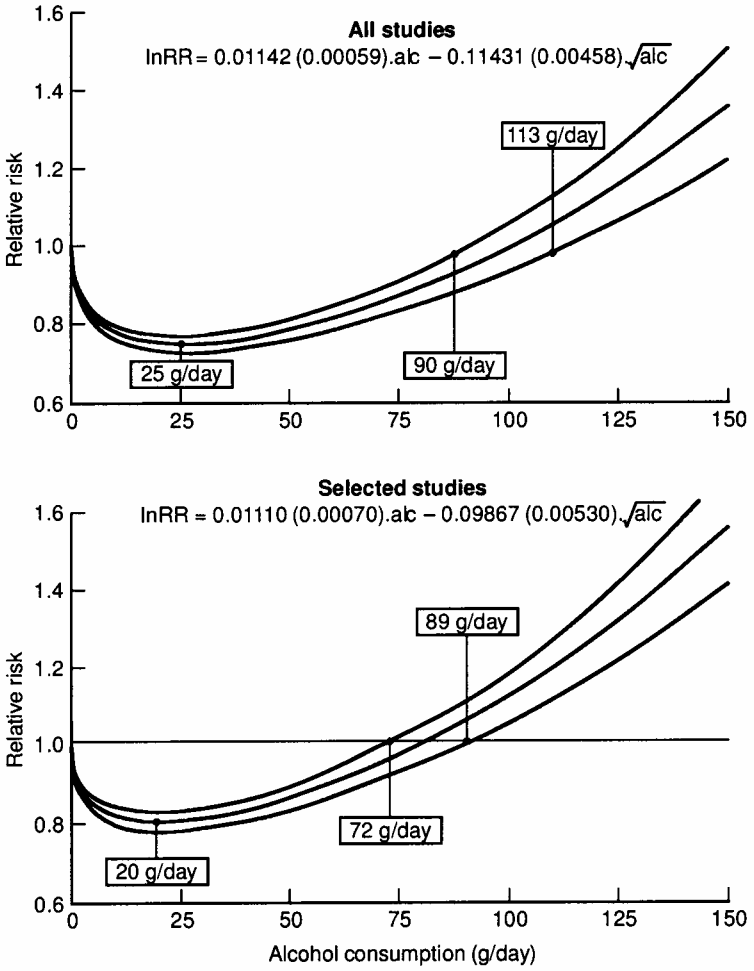

Figure 3.2 Functions (and corresponding 95% confidence intervals) describing the dose-response relationship between reported alcohol consumption and the relative risk of coronary heart disease obtained by pooling all the 51 included studies and the 28 cohort studies for which a high quality score was assigned. The fitted models (with standard errors in parentheses) and three critical exposure levels (nadir point, maximum dose showing statistical evidence of protective effect, and minimum dose showing statistical evidence of harmful effect) are reported.
Reproduced from: Corrao *et al.* (2000).

Studies considering only fatal coronary heart disease events tended to report less of a protective effect than studies including both fatal and non-fatal events as the endpoint (Figure 3.3). Such evidence might be explained by a shorter survival, and/or by a more severe appearance of the disease, in heavy drinkers who experience a heart attack. If this is true, the functions derived from studies considering only non-fatal

coronary heart disease as an end-point might be biased because of the preferential inclusion of less severe forms of the disease.

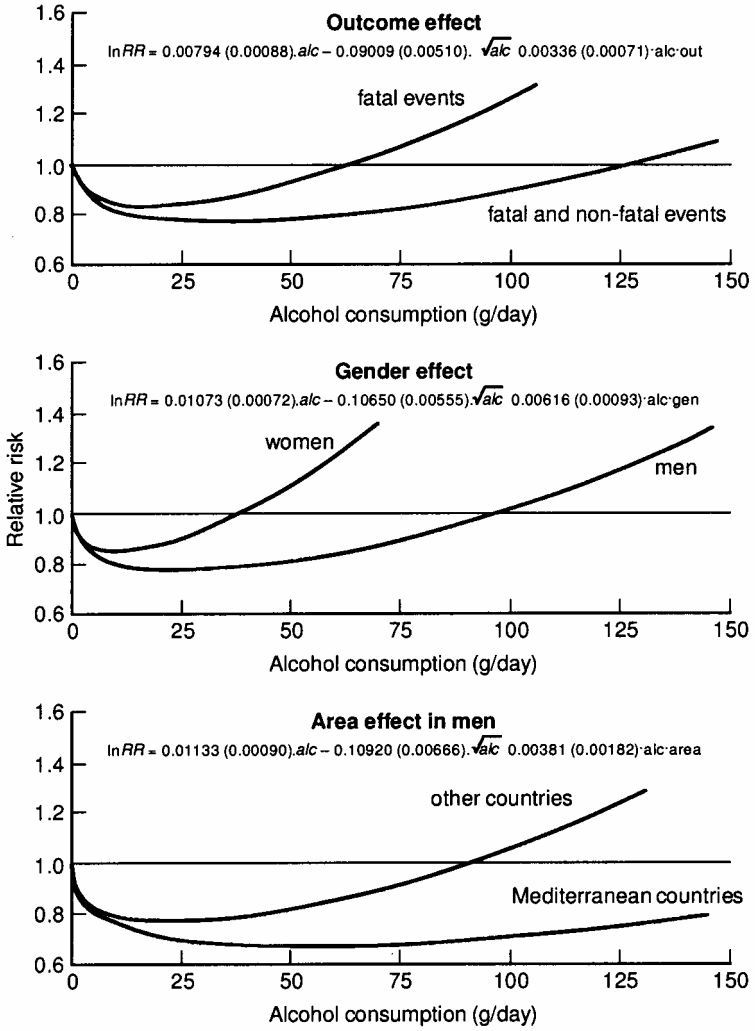

Figure 3.3 Outcome variables, gender and area in which the study was performed as effect modifiers of the alcohol-related relative risk function of coronary heart disease. The fitted models (with standard errors in parentheses) are reported.
Reproduced from: Corrao *et al.* (2000).

There were important and significant differences in the relative risk functions between men and women. The major protective effect occurred at 10 grams of alcohol a day (less than one drink a day) in women and 25 grams of alcohol a day (two drinks a day) in men. Moreover, significant evidence of harmful effects of alcohol on coronary heart disease began at 52 grams of alcohol a day for women and at 114 grams of alcohol a day for men. These results strongly suggest that the higher alcohol-related susceptibility of women (Frezza *et al.* 1990; Lieber 1995) acts towards both protective and harmful effects.

Studies performed in Mediterranean countries tended to report larger protective effects than studies performed in countries outside the Mediterranean region. This could be due to different patterns of alcohol intake between the two areas. In particular, Mediterranean drinking habits are more characterized by the use of daily constant amounts of alcohol mainly in the form of wine, (Trichopoulou & Lagiou 1997) while in Northern Europe and in the United States, alcohol is more commonly consumed during the weekend in the form of beer and spirits. With an equal dose of alcohol, Mediterranean patterns of drinking and other habits may be associated with a lower risk of disease.

Patterns of drinking are highly important in the relationship between alcohol consumption and the risk of coronary heart disease, cardiac arrthymias and sudden coronary death. There are a number of studies which suggest that high volume drinking occasions may precipitate myocardial ischemia or infarction. In the British Regional Heart Study, men who had 3-6 drinks per day on weekends had a 20% increase in the relative risk of myocardial infarction as opposed to men who had 1-2 drinks daily (Shaper *et al*. 1987). A case-control study from Australia compared alcohol consumption patterns in 11511 cases of acute myocardial infarction or coronary death with 6077 community-based controls (McElduff & Dobson 1997). Participants were asked to report how many drinks they usually consumed on a day when they drank alcohol. When compared to non-drinkers, there was a reduced risk of a major coronary event in men who drank 1-4 drinks per day on 5-6 days per week (by 25%-64%) and also in women who drank 1-2 drinks per day on 3-4 days per week (by 31%-61%). However, men who drank 9 or more drinks per day on 1-2 days a week had a 2.4-fold increase in risk of a major coronary event, while women who drank 5 or more drinks per day showed a 2.8-fold increase in risk. In a Finnish study, an analysis of beer drinkers revealed a seven-fold increase in relative risk of fatal myocardial infarction in men whose usual dose of beer was six or more bottles per session (72 g or more of alcohol), although no overall relationship between usual beer dose and acute myocardial infarction was identified (Kauhanen *et al*. 1997). Increased risk with high volume drinking occasions is also consistent with the angiographic findings of Gruchow *et al*. (1982) who studied 526 men referred for coronary angiography and assessed the level of occlusion of coronary vessels in relation to patterns of alcohol intake. They reported that an inverse association between the amount of alcohol consumed and occlusion score was reversed for subjects who had variable or sporadic patterns of alcohol intake. They utilized a ratio of maximum to usual amounts of alcohol consumed by drinking occasion as the index of variability in alcohol intake and found an approximate 25% increase in occlusion score in subjects with the highest variability ratios.

High volume drinking occasions are also important for cardiac arrhythmias. Case-control studies have indicated that atrial fibrillation appears the most common form of arrhythmia induced by both consistent heavy alcohol consumption and high volume drinking occasions (Lowenstein *et al*. 1983; Rich *et al*. 1985; Koskinen *et al*. 1987; Koskinen *et al*. 1990). It has been estimated that in 15%-30% of patients with atrial fibrillation the arrhythmia may be alcohol-related, with possibly 5%-10% of all new episodes of atrial fibrillation explained by excess alcohol use (Rich *et al*. 1985). Other forms of arrhythmias that have been observed with alcohol include atrial flutter, atrial tachycardia, junctional tachycardia and multiple atrial premature beats (Regan &

Ettinger 1978; Moushmoush & Abi-Mansour 1991). Increased ventricular ectopic activity, including ventricular tachycardia, has been documented after heavy ingestion of alcohol in persons with and without apparent heart disease. The increase in arrhythmia may offer an explanation for the association of acute alcohol consumption and sudden coronary death in heavy drinkers (Robinette *et al*. 1979; Suhonen *et al*. 1987; Wannamethee & Shaper 1992), including those without any evidence of pre-exiting ischaemic heart disease (Gordon & Kannel 1983; Wannamethee & Shaper 1992). It may be that non-participation by heavy drinkers may have biased results from other population studies where only dose-response inverse relationships with coronary disease have been reported. In support of this contention, record linkage of mortality data from a cohort of male inhabitants of Goteburg, Sweden, revealed that those subjects who elected not to take part in longitudinal studies had a greater prevalence of both registration with the Temperance Board as a problem drinker as well as a significant increase in coronary death, particularly sudden coronary death (Rosengren & Wilhelmsen 1987).

Biological mechanisms

The relationship between alcohol consumption and the risk of coronary heart disease is biologically plausible. In the absence of severe liver impairment, alcohol consumption raises levels of high density lipoprotein cholesterol (HDL). HDL removes fatty deposits in blood vessels and thus is associated with a lower risk of coronary heart disease deaths (Klatsky 1999). Moderate alcohol intake favourably affects coagulation profiles, in particular, through its effects on platelet aggregation (McKenzie & Eisenberg 1996) and fibrinolysis (Reeder *et al*. 1996; Gorinstein *et al*. 2003). Other pathways which are currently discussed (Single *et al*. 2000) include protection by changing insulin resistance, by effects on hormonal profiles, in particular, alcohol's estrogenic effects, by promoting vasodilatation and by mediation through the anti-oxidative constituents of alcoholic beverages. Alcohol's impact on coagulation mechanisms is likely to be immediate and, since lipid modification in older age groups produce significant benefit, the impact mediated through elevation of HDL cholesterol can probably be achieved by alcohol consumption in middle and older age (Criqui 1994). It seems that it is alcohol, rather than any specific type of beverage, that reduces the risk of coronary heart disease (Mukamal *et al*. 2003).

Social harms and intentional and unintentional injuries

The relationship between how the alcohol is consumed (drinking patterns), as opposed to the volume of alcohol consumption, has been studied as a risk factor for social harms and intentional and unintentional injuries (Dawson 1996; Gruenewald *et al*. 1996; Midanik *et al*. 1996; Rehm *et al*. 1996; Rossow 1996; Mcleod *et al*. 1999; Willie *et al*. 2000) and found to be important.

The term drinking patterns includes all aspects of alcohol use that are not covered by the term 'volume of drinking' (Rehm *et al*. 1996). Such aspects include temporal variations in drinking, heavy drinking occasions, settings, activities or circumstances associated with drinking, some personal characteristics of drinkers and characteristics of drinking partners and types of beverages consumed.

In an analysis of risk functions for the frequency of a number of alcohol related negative social consequences, Wyllie *et al.* (2000) found that among the most commonly experienced consequences the pattern seen was a straight line in which the frequency of the consequences increased proportional to the annual volume of alcohol consumption, with no clear evidence of any threshold effect. The increased risk at the lowest levels of alcohol consumption appeared to be due to low volume drinkers who occasionally consumed larger quantities, as the risk effectively disappeared when those drinking larger quantities were removed.

To assess the relationship of alcohol use and two types of alcohol-related problems (ICD-10 dependence on alcohol and drunk driving), Midanik *et al.* (1996) developed risk curves for average number of drinks per day during the previous year (volume) and the number of days of drinking five or more drinks during one day, using the data of 22,102 current drinkers from the 1988 US National Health Interview Alcohol Supplement survey who consumed at least 12 drinks in the previous year. The risks of drunk driving and ICD-10 dependence increased with the volume of alcohol consumed. When a measure of frequency of having five or more drinks on one day was used as the independent variable, the shapes of the curves changed, but more importantly, the risk of drunk driving rose much faster and attained a significantly higher level than ICD-10 dependence, even at relatively small numbers of days of drinking five or more drinks a day. By 50 days of drinking five or more drinks a day (approximately once a week), the probability of drunk driving was 0.50 whereas the risk for ICD-10 dependence was slightly less at 0.30. At higher frequencies of drinking five or more drinks a day, the risks of drunk driving and ICD10 converged.

For individuals reporting *not having had* five or more drinks on any days in the last year, the risks for both ICD-10 dependence and drunk driving were fairly small, regardless of volume of alcohol consumption (numbers of drinks per day in the past year) in sharp contrast to those who reported *having had* five or more drinks on at least one day in the last year (Figure 3.3; reproduced from Midanik *et al*. 1996). With the exception of the highest level, the probability for drunk driving for those who drank five or more drinks a day at least once was 0.40 at an average volume of 2.5 drinks per day. At this same volume level, the probability of drunk driving was less than 0.05 for those never having drunk five or more drinks a day in the last year. For ICD-10 the differences that existed for the two groups were similar but less striking.

Thus, for both ICD-10 dependence and drunk driving, the risks increase with both volume of alcohol consumption and the frequency of high volume drinking occasions.

The importance of risk of consumption on a single occasion was demonstrated in an Australian study that examined the relationship between the volume of alcohol consumed in a previous 6 hour period and the risk of sustaining an injury (McLeod *et al*. 1999). The risk curves showed a threshold effect at 60g of alcohol for men and 30g of alcohol for women. The risk of sustaining an injury after consuming more than 60 g of alcohol in a 6-hour period, after controlling for demographic variables was 9.6 for women and 2.1 for men.

Figure 3.3 US NHIS 88 data: current drinkers. ¦ , ICD10: *had* five or more drinks on at least one day in the last year; ? , ICD10: *never had* five or more drinks on at least one day in the last year; ? , drunk driving: *had* five or more drinks on at least one day in the last year; ⧗, drunk driving: *never had* five or more drinks on at least one day in the last year. The clear symbols represent the 95% confidence limits.
Reproduced from: Midanik *et al*. (1996).

All cause mortality

When examining the relationship between alcohol consumption and total mortality, the shape of the curve depends on the distribution of causes of death amongst the population studied and on the level and patterns of alcohol consumption within the population (Anderson & Lopez 1995). At younger ages deaths from traffic accidents and violence (which are increased by alcohol consumption) predominate, while coronary heart disease deaths (which are reduced by alcohol consumption) are rare. The position is reversed at older ages.

There is a positive, largely linear relationship between reported usual alcohol consumption and total mortality in populations or groups with low coronary heart disease rates (which includes younger people everywhere). On the other hand there is a J or, among older populations, a U shaped relationship between reported usual alcohol consumption and total mortality in populations with high rates of coronary heart disease. The exact age when the relationship changes from linear to a J or U shape depends on the distribution of causes of death, but in most industrialized countries occurs at about an age of death of 50 to 60 years (Rehm & Sempos 1995a). This also means that the J-shaped curve should not be expected and cannot be found in populations with no or few coronary heart disease deaths, for example, in some low

income countries (Murray & Lopez 1996), or in younger age groups (Andreasson *et al.* 1988; Andreasson *et al.* 1991; Rehm & Sempos 1995b; Romelsjo & Leifman 1999).

The lowest observed risk for overall mortality has been associated with an average consumption of 10 g of pure alcohol per day for men and somewhat less for women (English *et al*. 1995; White 1999). As with coronary heart disease, the level of consumption associated with the least risk for mortality varies by country. Thus, studies from countries with higher per capita consumption levels find the level of consumption associated with the lowest rate of mortality to be higher (Farchi *et al*. 1992; Brenner *et al*. 1997; Keil *et al*. 1997; Renaud *et al*. 1998) than countries with lower per capita consumption levels (English *et al*. 1995; White 1999).

In the United Kingdom, it has been estimated that the level of alcohol consumption with the lowest risk to mortality (nadir) for women is 0 g per day aged under 45 years, 3 g per day aged 45 to 64 years and 4 g per day aged 65 years and over (White *et al*. 2002). For men, the nadirs are 0 g per day aged under 35 years, 2.5 g per day aged 35-44 years, 9 g per day aged 45 to 64 years, and 11 g per day aged 65 years and over (250ml of beer and one 125ml glass of wine contains about 10 g of alcohol). Above the nadir, the risk of mortality increases with increasing alcohol consumption. The US Cancer Prevetnion II study estimated that for North American men aged 35 to 69 years at death, the risk of death increases from 1167 per 100,000 at 10 g of alcohol per day to 1431 per 100,000 at 60 or more g per day (Thun *et al.* 1997). For North American women, the risk increases from 666 per 100,000 at 10 g of alcohol per day to 828 per 100,000 at 60 or more g per day.

Aggregate time series data

Another methodological approach to study the relationship between alcohol consumption and risk of death is that based on aggregate time series data, which can study individual-level relationships, particularly those that are prone to be confounded by selection effects, at the population level (Kerr *et al.* 2000; Hemstrom 2001; Norstrom 2001; Norstrom & Skog 2001; Ramstedt 2001a; Ramstedt 2001b; Rossow 2001; Skog 2001a; Skog 2001b).

At the societal level, there is a direct relationship between levels of per capita consumption and alcohol related harm. The European Comparative Alcohol Study reviewed the post-war experience of alcohol and mortality in the countries of the European Union. Time series analysis demonstrated that there is a positive and significant relationship between changes in alcohol consumption and changes in both overall and alcohol related death for both men and women (Figure 3.4; reproduced from Norstrom & Skog 2001). The relationship applies to all types of alcohol related harm, and is stronger in countries with lower overall alcohol consumption than in countries with higher overall alcohol consumption. The cardioprotective effect was found to be absent at the population level (Hemstrom 2001).

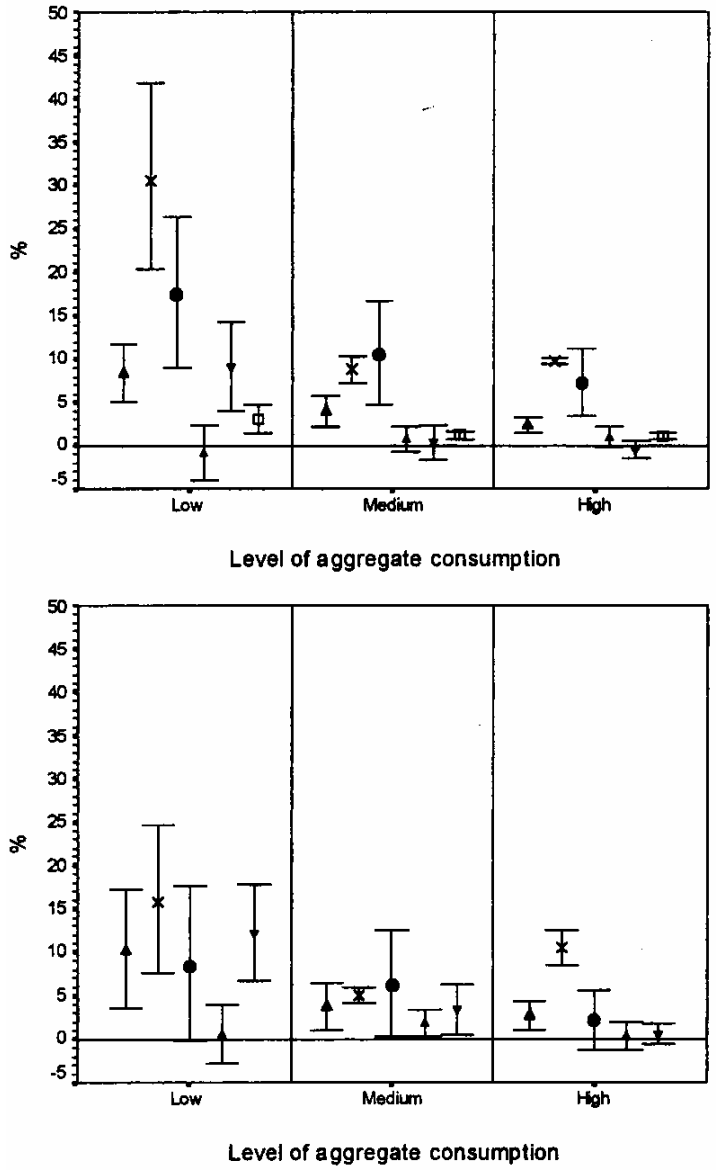

Figure 3.4 Estimated effects (% +/- 2SE) of a 1-litre increase of per capita consumption on various forms of mortality in low-, medium- and high-consumption countries. Top = males; bottom = females. Legends: ? = accidents; x= cirrhosis; ?= homicide; ? = IHD; ? = suicide; ? = all-cause mortality.
Reproduced from: Norstrom & Skog 2001

DISCUSSION

Summary of the findings

Since the 1993 publication (Anderson *et al*. 1993), the relationship between alcohol consumption and risk of liver cirrhosis has been confirmed. Cancer of the colon has been added to the list of cancers, for which alcohol increases the risk.

Further meta-analyses found a relationship between alcohol consumption and risk of breast cancer, which cannot be explained by confounding of known risk factors for breast cancer.

There is now sufficient evidence to confirm that alcohol increases the risk of both ischaemic and haemorrhagic stroke, with no clear evidence of a protective effect of light to moderate drinking on the risk of ischaemic stroke. Although a meta-analysis has confirmed that alcohol reduces the risk of coronary heart disease, the size of the reduction in risk is both smaller and occurs at a lower level of alcohol consumption than previously considered. Further, at higher doses of alcohol consumption the risk of coronary heart diseases increases.

More studies have been published on the risk curves for intentional and unintentional injuries, which demonstrate that the risks increase with the volume of alcohol consumption, the frequency of high volume drinking occasions and the volume of alcohol consumed during an occasion. Only a few studies were identified that described the risk function relationships for the social consequences of alcohol consumption (Klingemann 2001).

When examining the relationship between alcohol consumption and total mortality, the shape of the curve depends on the distribution of causes of death amongst the population studied and on the level and patterns of alcohol consumption within the population. In populations with high rates of coronary heart disease, which demonstrate a J or U shaped relationship between alcohol and risk of total mortality, the lowest risk for total mortality is found to occur at reported levels of alcohol consumption of 10 g/day for men and somewhat less for women, a level lower than previously considered.

Causality and attribution

In determining causality and attribution, both reliable outcome measurements and causal pathways are needed. To varying degrees, different health and social outcomes have both an objective element and an element that is a matter of social definition. Even at the one end of the continuum, where the fact of death can be measured objectively and reliably, national recording and coding practices often vary from one country to another (Ramstedt 2002). Further, alcohol's involvement in a death may be missed by those certifying the death, or may be deliberately not mentioned to protect the reputation of the deceased. A study of death recording in 12 cities in 10 countries found that, after supplementing data from the death certificate with data from hospital records and interviews with attending physicians and family members, the net number of deaths assigned to the disease category "liver cirrhosis with mention of alcoholism" rose by 135%, with the majority of the new cases being recoded from categories of cirrhosis without mention of alcohol (Puffer & Griffith 1967).

For health problems that do not result in death, social definition plays an even larger part (Room *et al*. 2001). While internationally comparable statistics by causes of death have long been available (World Health Organization 1992), there are no cross-nationally comparable data on disabilities (Goerdt *et al*. 1996; Rehm & Gmel 2000a; World Health Organization 2001), which can lead to difficulties in overall attribution, since alcohol is more related to disability than to mortality (Murray & Lopez 1996). For social problems, as the term itself implies, the element of social definition becomes

more prominent and the way social matters are thought about in a given society changes over time. For this reason the role of alcohol as a causal factor in disease is presently more clearly understood scientifically than the role of alcohol in the causation of social harm.

Alcohol's causal role in social and health problems is usually contributory, being only one of several factors responsible for the problem. For health outcomes, epidemiological definitions stress not only consistent relations but also biological pathways (Rothman & Greenland 1998). Thus, the consistent relationship between alcohol and lung cancer found in many epidemiological studies (English *et al*. 1995) is not usually included as an alcohol-attributable disease because no biological pathway has yet been identified, and because the higher incidence of lung cancer in drinkers is believed to be caused by smoking (Bandera *et al*. 2001). However, it could be argued that smoking, or the persistence of smoking, is part of a causal chain linked to alcohol (Rothman & Greenland 1998), and that, if such a causal relationship could be established, then some cases of lung cancer would be attributable to alcohol.

While the causal status of the relationship between alcohol and health outcomes often depends on the plausibility of potential biological pathways, the causal status of the relationships between alcohol and social harm cannot usually be determined this way. An exception is aggressive behaviour. A causal link between alcohol intoxication and aggression has been supported by epidemiological (Collins & Schlenger 1988; Wiley & Weisner 1995) and experimental research (Bushman & Cooper 1990; Bushman 1997), as well as by research indicating specific biological mechanisms linking alcohol to aggressive behaviour (Peterson *et al*. 1990; Pihl *et al*. 1993; Sayette *et al*. 1993).

Finally, as noted in Chapter 2, the measurement of alcohol consumption brings with it its own problems. Most studies have paid little attention to drinking pattern. The measurement of alcohol consumption typically depends on self-report, with all the problems of underestimation that this entails. It is thus possible that the level of risk associated with a particular amount of alcohol consumption will, in fact, correspond to a greater amount of alcohol consumption. However, this might be balanced by the fact that it is uncommon for studies to measure consumption at more than one point in the lifetime. Alcohol consumption usually decreases with age, and in this case, the level of risk will correspond to a lower amount of alcohol consumption. For health conditions or social problems with a chronic aspect, the cumulative impact of drinking over time has not been studied extensively. Perhaps one model that could be used to overcome these difficulties is the British study of doctors and smoking, which has been ongoing for over 50 years (Doll *et al*. 1994; Peto *et al*. 2000). A replicated study using sophisticated and repeated alcohol measures, accounting for a wide range of confounding factors could give an accurate assessment of the risks of alcohol, the potential benefits of alcohol consumption and the change in risks with changes in the amount and patterns of alcohol consumed.

Is the relationship between alcohol consumption and reduced risk of coronary heart disease due to confounders?

Although the relationship between lower levels of alcohol consumption and reduced risk of coronary heart disease persists in most studies (Gaziano & Buring 1998), also after controlling for the possibility that non-drinkers might include people who have given up drinking because they were unwell (Shaper 1990a 1990b; Shaper, Wannamethee & Walker 1988; Rehm & Sempos 1995a); after adjusting for diet (Artaud-Wild *et al*. 1993; Rehm & Sempos 1995a 1995b); and after adjusting for social isolation (Skog 1996; Murray *et al*. 1999), some individual-level cohort studies have not confirmed the relationship. Studying a cohort of employed Scottish men aged over 21 years, Hart *et al*. (1999) found no elevated risk for coronary heart disease among abstainers, compared to light and moderate drinkers. They attributed their findings to a superior measurement of social class, a major confounder, and possibly to the fact that their non-random sample may have contained fewer men who had stopped drinking due to poor health. Other studies of the general population where respondents might be expected to have reduced their drinking due to poor health have found no differences between light drinkers and abstainers for all-cause mortality in multiple studies, attributed possibly to more precise drinking measures, general population sampling and more complete assessment of some known confounders (Fillmore *et al*. 1998a, Fillmore *et al*. 1998b; Leino *et al*. 1998).

Two studies have shown the importance of taking into account confounders. In the British Regional Heart Study (Wannamathee & Shaper 1999), although regular male drinkers showed a significantly lower risk of coronary heart disease than occasional drinkers, this benefit was only apparent for beer and spirit drinkers, but not for wine drinkers. Although occasional and regular drinkers of wine showed significantly lower rates of coronary heart disease than beer or spirit drinkers, this difference was no longer significant when controlling for the confounders of social class, smoking, body mass index and physical activity. In other words, the benefit seen in wine drinkers relative to other drinkers could have been attributed to advantageous lifestyles.

Similar findings were found in the UNC Alumni Heart Study (Barefoot *et al*. 2002) which identified several potential confounders that could account for a proportion of the beneficial health effects of alcohol, especially wine. Wine drinkers had healthier diets and were less likely to smoke than participants who preferred other beverages, even when controlling for socio-economic status. Non-drinkers reported lower vegetable intakes, higher fat consumption, higher body mass index values, and less exercise than did drinkers, all risk factors for coronary heart disease (Neil *et al*. in press).

It is difficult to understand why, although most studies find a relationship between alcohol consumption and coronary heart disease, some do not. Perhaps there is a systematic error present in the many studies which have found a relationship, with studies controlling often inadequately or not at all for critical confounders; perhaps it is because there is a self-selection into long-term abstinence versus the atypical drinking pattern of light and moderate but frequent drinking (Knupfer 1987; Skog 1995); perhaps it is because drinking per se becomes increasingly less as people age (Knupfer 1989); or

perhaps it is attributable to selection into new abstinence due to ill health (Shaper & Wannamethee 1998). There is a need to assess more closely the stability of drinking and abstinence in different cultures, the validity and reliability of the measures used, the competing sources of mortality, the differential drinking pattern distributions in samples studied and the strong possibility of complex interactions.

Implications for alcohol policy

The nature of the dose-response relationships found between alcohol and different aspects of harm is also relevant for alcohol policy development. Some relationships, such as that between alcohol and liver cirrhosis, show an exponential curve and no effect of the pattern of drinking. In response to this kind of relationship targeting effective strategies only at heavier consumers would result in a reduction of harm, since the heavier drinkers contribute a much larger fraction of all cases than the light and moderate drinkers. Other relationships show straight line or only moderately curved risk functions, such as those between alcohol intake and both suicide and trauma injuries (see Edwards *et al*. 1994). The majority of these kinds of negative experiences are found among lighter and more moderate drinkers (when characterised by volume of drinking over time) because the majority of all instances of high volume drinking occasions are found among these groups (Skog 1995). In relation to alcohol-related harm of this sort targeting prevention strategies only at heavier drinkers, even if effectively applied, would not succeed in minimizing the harm. Effective strategies which affect the drinking population more generally will, however, influence alcohol related harm when the risk function is only moderately curved and when it is much curved. This is because they have the potential to affect all of the drinkers who contribute to the experience of alcohol-related harm.

It is important to consider what kind of relationship one would get at the aggregate level, if the individual level relationship is J-shaped, as with the relationship between alcohol and risk of coronary heart disease (Skog 1996). What would happen to population mortality rates if the aggregate consumption level increased? This would depend to a large extent on the distribution of drinking within the population. If those who consumed less than the minimum risk level increased their intake, while those who consumed in excess of the minimum risk level cut back, the mortality rate must decrease. However, this is not a likely outcome, for it would imply that everybody adjusted their alcohol intake so as to maximize life expectancy. The drinkers who are today drinking at such a level that their health and social functioning is endangered are unlikely to reduce their drinking solely on the evidence for a minimum risk level of alcohol consumption. On the contrary, one could argue that if a substantial fraction of the population (the light drinkers) started to drink more heavily, then those who already drank above the minimum risk level might be induced to drink more, since they would find themselves living in an environment with more opportunities to drink. In the psychological literature on modelling, as well as in the sociological literature on small groups, there is evidence to suggest such a contagion effect (see Edwards *et al*. 1994).

In setting public health policies in the presence of a J-shaped risk function, it is crucial to make a distinction between the minimum risk level of intake for the individual and for the population. Due to the highly positively skewed distribution of

alcohol consumption in populations, it is likely that the minimum risk consumption level for a population will be considerably lower than that for an individual. How much lower will depend on the shape of the individual risk function and on how the distribution of alcohol consumption changes, as the overall consumption level of the population changes. In not too unrealistic circumstances (proportional changes in consumption), the minimum risk consumption level for the population could be less that that for an individual drinker by a factor of as much as 5 (Skog 1992). In countries with high rates of coronary heart disease, the per capita level associated with minimum risk for mortality may be in the order of about 3 litres of absolute alcohol among drinking adults. In countries with low rates of coronary heart disease, the level is likely to be substantially lower. This would imply that most high income countries are already consuming in excess of the minimum risk level for populations, a prediction supported by the evidence (Norstrom & Skog 2001; Rehm *et al.* in press). Thus in such countries, policy which results in a reduction in alcohol consumption will also result in a net reduction in harm.

CONCLUDING REMARKS

Alcohol is a risk factor for a wide range of physical harms, with the risk of harm increasing with the overall volume of alcohol consumed, increasing with the frequency of consuming a large volume of alcohol in a short period of time and increasing with the volume of alcohol consumed in a short period of time. The harms include cirrhosis of the liver, a number of cancers and cardiovascular diseases. There is evidence that the use of alcohol increases the risk of female breast cancer, with the cumulative incidence of breast cancer by age 80 years increasing linearly from 8.8 per 100 women in non-drinkers to 13.3 per 100 women consuming an average of six alcoholic drinks each day. Alcohol in both acute and chronic forms increases the risk of cardiovascular diseases including coronary heart disease, sudden coronary death and cerebrovascular events. Alcohol in smaller doses appears to reduce the risk of coronary heart disease, but not of ischaemic stroke, with the reduction in risk being lower in higher quality studies than in all studies. Discussion is still ongoing as to whether or not the relationship between alcohol consumption and risk of coronary heart disease is due to confounders. If the relationship is casual, the reduction in risk of coronary heart disease can be achieved by very low doses of alcohol, certainly less than 10g every other day, and possibly as low as 10g a week, and probably does not require a long term use to be achieved. At reported levels of alcohol consumption of more than 10-15 g a day, all individuals are likely to accumulate risk of harm. An examination of the implications of the dose response relationships at the individual level implies that alcohol policy which results in a reduction in alcohol consumption will also result in a net reduction in harm.

Hazardous alcohol consumption has been defined as a level of consumption or pattern of drinking that is likely to result in harm should present drinking habits persist (Babor *et al*. 1994), and harmful alcohol consumption as a pattern of alcohol use that is causing harm to health (World Health Organization 1992). Whether or not advice given in general practice settings is effective in reducing hazardous and harmful alcohol consumption is the subject of Part II.

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PART II

THE EFFECTIVENESS OF GENERAL PRACTICE IN REDUCING THE RISK OF ALCOHOL

CHAPTER 4

HOW EFFECTIVE IS GENERAL PRACTITIONERS' ADVICE: A RANDOMIZED CONTROLLED TRIAL[1]

ABSTRACT

Aim To determine the effectiveness of advice from general practitioners to heavy drinking men (consuming 350-1050 grammes of alcohol per week) and to heavy drinking women (consuming 210-700 grammes of alcohol per week) to reduce their alcohol consumption.

Method One hundred and fifty-four men and seventy two women recruited from eight general practices were allocated randomly to treatment and control groups. Men and women in the treatment group received advice from their own general practitioner to reduce their alcohol consumption. Men and women in the control group completed the assessment interview but received no advice from their general practitioner about their alcohol consumption except at their own request.

Findings At one year follow-up, when analyzed according to intention to treat, men in the treatment group had reduced their consumption by an excess of 65 grammes of alcohol per week when compared with the control group ($p<0.05$). Women in the treatment group had reduced their alcohol consumption from an average of 35 to 24 units[2] per week. Similar reductions were found in the control group (from 37 to 27 units per week). The lack of evidence for a treatment effect for the women may be explained by contamination of the control group by informal interventions.

Conclusions There is sufficient evidence from the present study and studies published at the same time to recommend systematic screening of patients' alcohol consumption by general practitioners and the giving of advice to those found to be at risk.

INTRODUCTION

In the 1980s, the terms and conditions of service for general practitioners in the United Kingdom required them to offer health checks to their patients, including screening for alcohol consumption and offering counselling to drinkers identified as at risk (Department of Health 1989). A number of strategies were proposed for primary health care workers to manage alcohol problems including the need to screen patients

[1] Published as: Scott, E. & Anderson, P. (1990) Randomized controlled trial of general practitioner intervention in women with excessive alcohol consumption. *Drug and Alcohol Review* 10, 313-321; Anderson, P. & Scott, E. (1992) The effect of general practitioners advice to heavy drinking men. *British Journal of Addiction* 87,891-900.

[2] In the original publications, the results for the men were reported in grammes of alcohol per week and for the women in units of alcohol per week, where one unit is equivalent to 10 grammes of alcohol. The notation is kept the same in this chapter.

for alcohol consumption and to give advice to those who are at risk because of their drinking (Babor *et al*. 1986; Royal College of General Practitioners 1986; Anderson 1989; Pollack *et al*. 1987; Skinner 1987; McLean 1988).

It is important to know if general practitioner advice is effective in helping heavy drinkers cut down on their drinking. In the United Kingdom, the Medical Research Council (MRC) study had demonstrated the effectiveness of advice for both men and women (Wallace *et al*. 1988), whereas another study failed to detect an effect (Heather *et al*. 1987), probably due to inadequate sample size and problems of compliance within the general practices (Neville *et al*. 1987; Heather 1988). Other studies were being undertaken in other parts of the world (Babor *et al*. 1987; Saunders 1987; Svokas *et al*. 1988; Romelsjo *et al*. 1989; Richmond *et al*. 1990).

A brief intervention package on alcohol (the 'Cut Down on Drinking' kit) was devised and a trial designed to evaluate its impact on male and female patients identified as at risk because of their drinking.

PATIENTS AND METHODS

Trial design

The randomized controlled trial was designed to assess the impact of advice from a general practitioner to reduce the drinking of male patients with regular excessive alcohol consumption (defined as at least 350 g of alcohol per week) and of female patients with regular excessive alcohol consumption (defined as at least 210 g of alcohol per week). The duration of the study was 12 months. The size of the effect to be detected was estimated as a reduction in the proportion of patients with excessive alcohol consumption of 25% in the treatment group and 10% in the control group.

Assuming that 10% of male patients screened would be consuming 350 g or more of alcohol per week and that 5% of female patients screened would be consuming 210 g or more of alcohol per week and allowing for a 70% attendance at initial assessment interview and for a loss to follow-up of 25% in each group, it was calculated that 4,000 men and 8,000 women would need to be screened to give the trial 90% power to detect the above effects at the 5% level of significance. This would result in 100 men and 100 women being followed up at one year in each of the treatment and control groups.

In order to recruit sufficient patients, eight group practices within the Oxford Regional Health Authority were recruited. The practices were chosen on the basis of their response to a question indicating interest in alcohol research in a previous survey (Anderson 1985).

Screening

A self-administered health survey questionnaire (HSQ) including a quantity frequency measure of alcohol consumption was distributed to patients aged 17-69 years registered with the general practices. In two general practices the questionnaires were mailed to all patients aged 17-69 with a known address. In the remaining six practices,

questionnaires were handed out during a 3 to 6 month period to patients attending the general practice.

Recruitment and assessment

A random sample of one in five men whose questionnaire response indicated an alcohol consumption of more than 350 g of alcohol per week and of one in twelve women whose questionnaire response indicated an alcohol consumption of more than 210 g of alcohol per week were allocated to a control group who received no further action until they were invited for follow-up at one year. This group was chosen to determine the effects of assessment on alcohol consumption. All other men whose questionnaire responses indicated that they consumed more than 350 g of alcohol per week and all other women whose questionnaire responses indicated that they consumed more than 210 g of alcohol per week were invited to an assessment interview held at the general practice. No mention was made that the interviews were about alcohol. A further 20% of the men who consumed 220-349 g alcohol per week, 10% of the women who consumed 150-210 g of alcohol per week and a random sample of one in 75 of the remaining men and women were also invited to the assessment interview; this was in order to determine the performance of the questionnaire as a screening instrument.

The assessment interviews were carried out by one of the authors (E.S.). The interview was by structured questionnaire. Information was collected on demographic variables (age, occupation and marital status). Social class and socio-economic group were classified according to the OPCS classification of occupations (Office of Population Censuses and Surveys 1980).

Information was collected on alcohol consumption (week drink diary) (Poikolainen & Karkkainen 1983) and binge drinking. Four alcohol-related problem scales were used. Accident, social and dependent scales were obtained from the Edinburgh Hospital study (Chick *et al*. 1985) and a physical health scale was devised for this study. The accident scale had 3 points, the social scale 6 points and the dependence scale 6 points. Respondents were dichotomized as normal (no points) or as abnormal (1 + points). The physical health scale had 7 points and respondents were dichotomized as normal (no points) or as abnormal (2+ points).

For a sub-sample, measures of psychological well-being were included using the shortened general health questionnaire (Goldberg & Hillier 1979), the positive and negative self-esteem scale (Andrews & Widdey 1976), the present life satisfaction scale (Bradburn 1969), and the positive and negative affects scale (Warr 1978).

The medical notes were audited and consultations recorded for the previous year. Diagnoses at consultation were coded using the Royal College of General Practitioners classification (Royal College of General Practitioners 1984). Venesection was performed and blood sent to the John Radcliffe Hospital, Oxford for estimation of gamma glutamyl transferase and mean red cell corpuscular volume. Breath alcohol was measured using a Lion alcohol meter (Wiseman *et al*. 1982).

Men were included in the study if they consumed more than 350 g of alcohol per week during the previous week and women if they consumed more than 210 g of alcohol per week during the previous week as measured at interview. Both men and women were excluded from the study if they had received advice during the previous

year to cut down on drinking or if men consumed more than 1050 g of alcohol per week and women more than 700 g of alcohol per week.

At the end of the assessment interview patients were randomly allocated to treatment and control groups using a table of random numbers.

Intervention

Patients in the control group received no advice from their general practitioner about drinking except at their own request. Patients randomized to the treatment group were asked at the end of the assessment interview to make an appointment with their own general practitioner. The components of the advice which have been described in more detail elsewhere (Anderson 1989), lasted ten minutes and consisted of feedback of the assessment interview and results of blood tests, information on the risks of excessive drinking, information on the benefits of drinking less, information on how the patient's weekly alcohol consumption compared with that of the general population using a histogram, and advice to reduce alcohol consumption to below 210 g (21 units of alcohol) per week for men and to below 140 g (14 units of alcohol) per week for women. Advice was supplemented with a self-help booklet (the 'Cut Down on Drinking' booklet) designed for the study.

The general practitioners received one 15 minute training session as a group and one 15 minute training session as an individual prior to their first patient interview. The practitioners were given the results of the assessment interview for each patient and a written summary of the intervention strategy.

Follow-up

Patients were invited by letter to return to the practice at one year for a follow-up interview which was conducted by a researcher blind to which group the patient was in. Follow-up interviews repeated the initial assessment procedure.

Analysis

Results were analyzed both according to the protocol (by using data obtained at one year assessment and excluding from the analysis all individuals who did not attend follow-up) and on the basis of intention to treat (where, for patients who did not attend at one year assessment an assumption was made that there was no change in alcohol consumption or in laboratory or clinical measurements).

Unless otherwise stated, results are given on the basis of intention to treat which represents the more conservative estimate of the effects of intervention.

Tests (c^2) after Yates correction were used to test for differences between groups for dichotomized variables unless otherwise stated (Norvsis 1988). McNemar's tests were used for paired differences for dichotomized variables (Norvsis 1988). T-tests were used to test for differences between groups for continuously distributed variables (Norvsis 1988). Analysis of covariance was used for testing a treatment effect for continuously distributed variables, the dependent variable being the variable at the 1-year assessment, the factor being treatment or no treatment and the covariate being the same variable as the dependent variable but at initial assessment (Norvsis 1988).

Multiple analysis of variance was used to test for the relative influence of possible predictive variables on outcome measures (Norvsis 1988).

Outcome variables

Retrospective alcohol consumption in the 7 days before interview is generally accepted as being the most reliable indicator of regular consumption (Poikolainen & Karkkainen 1983) and this was taken as the principal outcome measure, the main component of advice being to reduce alcohol consumption. Consumption as assessed by the health survey questionnaire was taken as a secondary outcome measure and changes in laboratory and clinical tests as subsidiary measures.

RESULTS

Attendance

The study design and subject losses are shown in Figures 4.1 and 4.2. A total of 8483 men were screened. Of these 7034 (83%) reported a consumption of 0-219 g of alcohol per week, 925 (11%) a consumption of 220-350 g per week, and 524 (6%) more than 350 g per week. Of those consuming more than 350 g per week, one in five (n105 individuals) were allocated randomly to a control group who were not assessed but followed up at one year. The remaining individuals consuming more than 350 g per week (n419), one in five of those consuming 220-350 g per week (n185), and one in 75 of those consuming 0-210 g per week (n94) were invited for interview. Of the 698 men invited for interview, 361 (52%) attended. A higher proportion of men consuming 0-219 g per week (67/94, 71%) attended than heavier drinking men (294/604, 49%).

There were 194 men who consumed more than 350 g during the previous week in answer to the drink diary. Of these 40 (21 %) consumed more than 1050 g per week, or had been advised during the previous year to cut down on drinking, leaving 154 men eligible for randomization.

A total of 11521 women were screened. Of these 10793 (94%) reported a consumption of 0-4 units per week, 344 (3%) a consumption of 15-21 units per week, and 384 (3%) more than 21 units per week. Of those consuming more than 21 units per week, one in twelve (32 individuals) were randomly allocated to a control group who were not assessed but who were followed up at one year. The remaining individuals consuming more than 21 units per week (n352), one in ten of those consuming 15-21 units per week (n34), and one in 75 of those consuming 0-4 units per week (n42) were invited for interview. Of the 522 women invited for interview 247 (47%) attended.

There were 81 women who consumed more than 21 units during the previous week in answer to the drink diary. Of these 9 (11%) consumed more than 70 units per week or had been advised during the previous year to cut down on drinking, leaving 72 women eligible for randomization.

For the men, there were no significant differences at entry between the treatment and control groups in demographic variables, alcohol consumption, or clinical findings (Table 4.1). For the women, the only significant difference at entry between the treatment and control groups was that 73% of women in the treatment group scored

abnormal on the dependence score compared with 41% in the control group (P<0.02) (Table 4.2); there were no significant differences at entry between the two groups in demographic variables, alcohol consumption, or other clinical findings.

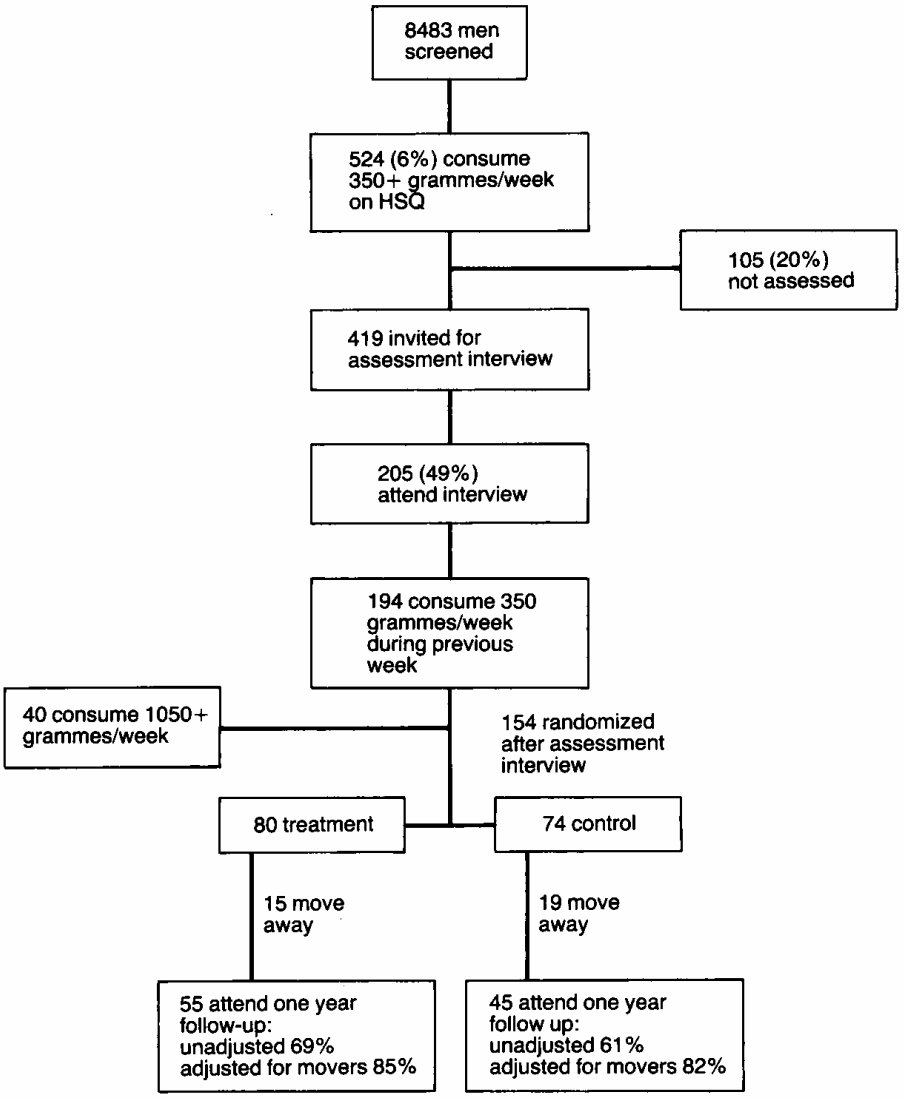

Figure 4.1 Study design and subject losses, men.

One year assessment

At 1-year assessment, 34 of the original 154 men (22%) had moved out of the practice area. Of the total sample, 100 men (65%) attended for interview. Of the available sample, 100 out of 120 (83%) attended for interview. The unadjusted attendance rate was similar for both treatment (69%) and control (61%) groups. The adjusted rate was 85% for the treatment group and 82% for the control group. There was no difference in initial mean alcohol consumption between those who attended for interview at 1 year (525 g per week) and those who did not (527 g per week). Fourteen

of the original 72 women (19%) had moved out of the practice area. Of the total sample, 50 women (69%) attended for interview. Of the available sample, 50 out of 58 (86%) attended for interview. The unadjusted attendance rate was similar for both treatment (76%) and control (64%) groups. The adjusted rate was 89% for the treatment group and 83% for the control group. There were no differences in initial mean alcohol consumption between those who were interviewed at one year (36.4 units per week) and those who were not (35.1 units per week).

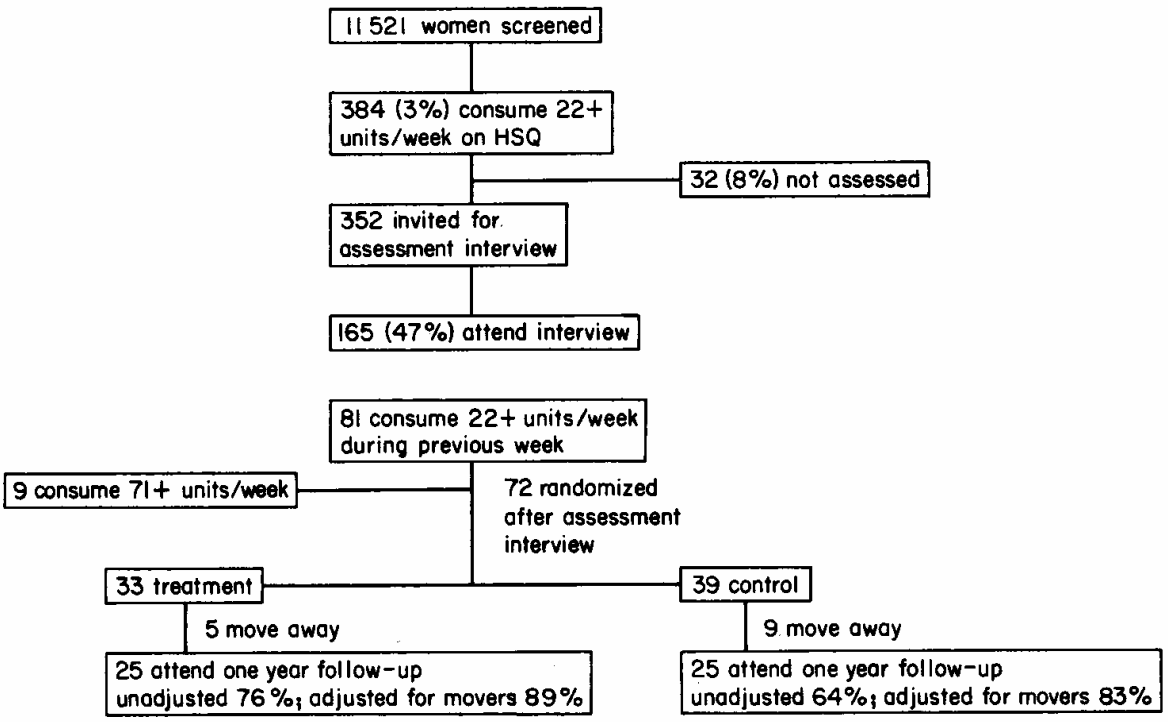

Figure 4.2 Study design and subject losses, women (1 unit=10g alcohol).

Principal findings

Changes in stated alcohol consumption

Analysis according to protocol When analysed according to protocol there was a significant reduction of 195 g per week when measured by previous week's alcohol consumption for the whole male sample ($t=6.9$; $P< 0.001$) but not when measured by health survey questionnaire (HSQ) (reduction of 53 g per week; $t=1.92$; NS). When analysed according to protocol there was a significant treatment effect of 1 year for the men when measured by previous weeks alcohol consumption (ANOVA, $F=4.03$, $P< 0.05$) or by health survey questionnaire (HSQ) (ANOVA, $F=8.43$, $P< 0.005$) (Table 4.3). For the female sample, when analyzed according to protocol there was a significant reduction in alcohol consumption at one year for the whole group when assessed by previous week's alcohol consumption (mean reduction 15.5 units per week, $t=6.1$, $P<0.001$) or by health survey questionnaire (HSQ) (mean reduction 8.8 units per

week, t=3.05, P<0.004) (Table 4.4). However, unlike the men, there was no evidence of any treatment effect for the women.

Table 4.1 Values at entry to study, men.

	Treatment group ($n = 80$)	Control group ($n = 74$)
Demographic variables	Mean (SE)	Mean (SE)
Age (years)	45.1 (1.9)	43.0 (2.0)
	No. (%)	No. (%)
Social class I–IIIn	26 (37)	25 (37)
Married	46 (58)	50 (68)
Consumption (g alcohol/week)	Mean (SE)	Mean (SE)
Interview (last week)	520 (14)	532 (17)
HSQ (q/f)	428 (23)	451 (22)
Binge drinking	No. (%)	No. (%)
Consume 140 g on 2+ occasions during previous 3 months	34 (43)	35 (47)
Beliefs about drinking	No. (%)	No. (%)
Believe heavy drinker	21 (26)	20 (27)
Cut down previously	28 (35)	20 (38)
Problem scores	No. (%)	No. (%)
Abnormal accident score	1 (1)	6 (8)
Abnormal health score*	36 (45)	31 (42)
Abnormal social score	20 (25)	23 (31)
Abnormal dependence score	33 (41)	31 (42)
Psychological scores†	Mean (SE)	Mean (SE)
Short GHQ	1.3 (0.5)	2.4 (1.0)
Life quality	2.5 (0.2)	2.6 (0.3)
Affect balance	2.4 (0.4)	1.9 (0.6)
Anxiety	24.3 (3.6)	27.3 (3.1)
Life satisfaction	58.7 (3.5)	54.4 (3.7)
Consultation rates‡	Mean (SE)	Mean (SE)
Consultation rate (annual)	3.0 (0.4)	2.7 (0.4)
Episode rate (annual)	2.1 (0.3)	2.6 (0.3)
Laboratory tests§	Mean (SE)	Mean (SE)
Y-GT (IU/l)	29.6 (3.3)	35.5 (4.0)
MCV (Ll/fl)	93.7 (0.5)	93.5 (0.4)
Breath alcohol (mg/100 ml)	4.0 (1.8)	4.3 (1.4)

* Excludes 6 in the treatment group and 4 in the control group who were not asked this question in 1 practice.

† Excludes 55 in the treatment group and 50 in the control group who were not asked these questions in 6 practices.

‡ Notes were audited at 1 year's follow-up for the year before initial assessment and for the year before the follow-up interview. Data is only available for the 120 patients remaining registered with the pactices at 1-year follow-up. Excludes 15 in the treatment group and 19 in the control group.

§ Excludes 17 in the treatment group and 14 in the control group who refused to give a blood test or for whom the blood sample was inadequate for testing.

Table 4.2 Values at entry to study, women.

	Treatment group $n = 33$	Control group $n = 39$
Demographic variables	Mean(SE)	Mean(SE)
Age (years)	44.4(2.4)	47.2(2.2)
	No.(%)	No.(%)
Social class I-IIIn	22(67)	27(69)
Married	20(61)	21(54)
Consumption (units/week)	Mean(SE)	Mean(SE)
Interview (last week)	35.3(1.6)	36.6(1.7)
HSQ (q/f)	31.8(2.4)	30.2(1.6)
Binge drinking	No.(%)	No.(%)
Consume 14+ units on 2+ occasions during previous 3 months	9(27)	4(10)
Beliefs about drinking	No.(%)	No.(%)
Believe heavy drinker	3 (9)	8(21)
Cut down previously	11(33)	17(44)
Problem scores	No.(%)	No.(%)
Abnormal accident score	1 (3)	2 (5)
Abnormal health score[1]	19(59)	21(54)
Abnomal social score	7(21)	7(18)
Abnormal dependence score	24(73)	16(41) $p < 0.02$
Psychological scores[2]	Mean(SE)	Mean(SE)
Short GHQ	4.1(1.6)	4.1(1.9)
Life quality	2.3(0.4)	2.6(0.3)
Affect balance	1.8(0.9)	2.0(0.7)
Anxiety	28.6(5.8)	26.8(4.2)
Life satisfaction	61.3(5.1)	53.3(6.3)
Consultation rates[3]	Mean(SE)	Mean(SE)
Consultation rate (annual)	4.8(0.8)	5.5(0.8)
Episode rate (annual)	3.3(0.5)	4.3(0.6)
Laboratory Tests[4]	Mean(SE)	Mean(SE)
Y-GT (IU/L)	16.4(3.2)	22.0(4.0)
MCV (fl)	93.5(0.6)	93.7(0.7)
Breath alcohol (mg/100 ml)	1.4(0.8)	1.7(0.8)

[1] Excludes one in each of treatment and control groups who were not asked this question in one practice.

[2] Excludes 19 in the treatment group and 26 in the control group who were not asked these questions in 6 practices.

[3] Notes were audited at one year's follow-up for the year before initial assessment and for the year before the follow-up interview. Data is only available for the 58 patients remaining registered with the practices at one year follow-up. Excludes 5 in the treatment group and 9 in the control group.

[4] Excludes 9 in the treatment group and 8 in the control group who refused to give a blood test or for whom the blood sample was inadequate for testing.

Table 4.3 Changes in alcohol consumption, men.

	Treatment			Control		
	Initial	Year	Difference	Initial	Year	Difference
According to protocol consumption (g/week)						
	($n = 55$) Mean (SE)	($n = 55$) Mean (SE)		($n = 45$) Mean (SE)	($n = 45$) Mean (SE)	
Interview last week	513 (17)	282 (29)	231	540 (22)	389 (44)	151 $p < 0.05$*
HSQ (q/f)	420 (30)	324 (19)	96	492 (30)	495 (50)	3 $p < 0.005$*
Intention to treat consumption (g/week)						
	($n = 80$)	($n = 80$)		($n = 74$)	($n = 74$)	
Interview last week	520 (14)	363 (25)	157	532 (17)	440 (30)	92 $p < 0.06$*
HSQ (q/f)	428 (23)	363 (17)	65	451 (22)	451 (32)	0 $p < 0.02$*
	No. (%)	No. (%)		No. (%)	No. (%)	
Low risk drinking (HSQ ≤ 220 g/week)	0	14 (18)		0	4 (5)	$p < 0.05$*
Consume 140+g on 2+ occasions during previous 3 months	34 (43)	18 (23)		35 (47)	29 (39)	$p < 0.05$†

* Analysis of covariance, see text.
† χ^2 test, see text.

Analysis according to intention to treat When analysed by intention to treat there was a significant reduction of 126 g per week for the whole male sample over the course of the year when measured by previous week's alcohol consumption (t=6.36, P< 0.001) but not when measured by health survey questionnaire (HSQ) (reduction 34 g per week, t=1.91, NS). When analysed according to intention to treat there was a treatment effect at 1 year for the men when measured by previous week's alcohol consumption which failed to reach statistical significance (ANOVA, F=3.74, p<0.06), but the treatment effect when analysed by health survey questionnaire (HSQ) was significant (ANOVA, F=5.77, P< 0.02). On both measures (previous week's alcohol consumption and health survey questionnaire) the net effect of treatment for the men when compared with the control group was 65 g per week (for HSQ, from Table 4.3 (428-363)-(451-451)). At 1 year's follow-up 18% of men in the treatment group had reduced their alcohol consumption to below 220 g per week compared with 5% in the control group (t=4.3, P< 0.04). For the female sample, when analyzed according to intention to treat there was also a significant reduction in alcohol consumption for the whole group over the year by measuring both at previous week's alcohol consumption (mean reduction 10.7 units per week, t=5.5, P<0.001) or by health survey questionnaire (HSQ) (mean reduction 6.1 units per week, t=2.9, P<0.005). However, unlike the men, there was no evidence of a treatment effect.

At 1 year's follow-up, 22.5% of men in the treatment group continued to consume 140 or more grammes on two or more occasions during the previous 3 months compared with 39.2% in the control group (P<0.05). Changes in reported alcohol consumption for the other groups followed up in the study (light drinkers, moderate drinkers, heavy drinkers previously advised to cut down on drinking, and the heavy control group) are shown in Table 4.5. There were no significant changes of alcohol

consumption of the light drinkers during the course of the year, but some evidence of reductions in alcohol consumption amongst the moderate drinkers and those who had previously received advice to cut down on their drinking. There were no significant changes in alcohol consumption of the heavy control group and at 1 year's follow-up there were no significant differences in mean levels of alcohol consumption between the heavy control group and the assessment control group when analysed according to protocol for both previous weeks alcohol consumption or by health survey questionnaire.

Table 4.4 Changes in alcohol consumption, women.

	Treatment			Control		
	Initial	Year	Difference	Initial	Year	Difference
According to Protocol consumption (u/week)						
	$n = 25$	$n = 25$		$n = 25$	$n = 25$	
	Mean(SE)	Mean(SE)		Mean(SE)	Mean(SE)	
Interview (last week)	36.0(2.1)	20.6(3.2)	15.4	36.9(2.4)	21.2(3.8)	15.7
HSQ (q/f)	31.6(3.1)	20.8(2.9)	10.8	31.4(2.1)	24.6(4.6)	6.8
Intention to treat consumption (u/week)						
	$n = 33$	$n = 33$		$n = 39$	$n = 39$	
	Mean(SE)	Mean(SE)		Mean(SE)	Mean(SE)	
Interview (last week)	35.3(1.6)	23.7(2.6)	11.6	36.6(1.7)	26.6(2.8)	10.0
HSQ (q/f)	31.8(2.4)	23.6(2.4)	8.2	30.2(1.6)	25.9(3.0)	4.3
	No.(%)	No.(%)		No.(%)	No.(%)	
Low risk drinking (HSQ $\leq$14 units/week)	0	9(27)		0	10(26)	
Consume 14+ units on 2+occasions during previous 3 months	9(27)	4(12)		4(10)	6(15)	

Clinical findings

For the men, there were significant improvements in the proportions with abnormal social scores (McNemar test, $P < 0.001$) and significant improvements in the proportions with an abnormal dependence score for both men (McNemar test, $P < 0.005$) and women (McNemar test, $P<0.001$) over the duration of the trial but there were no differences in outcome for the problem scores between treatment and control groups (Tables 4.6 and 4.7).

There were no significant changes neither in psychological scores or in laboratory tests nor in consultation or episode rates over the duration of the trial for both men and women, nor were there any significant differences between the treatment and control groups.

Factors influencing outcome

Changes in alcohol consumption were not significantly affected for treatment and control groups whether analysed combined or independently by the patients' age,

marital status, socio-economic group, or by level of alcohol consumption, problem scores, psychological scores, or blood test results at the initial assessment.

Table 4.5 Changes in alcohol consumption, men (mean (SE)).

	Light	Moderate	Previously advised	Heavy control
According to protocol				
	($n = 51$)	($n = 81$)	($n = 11$)	($n = 41$)
Interview last week				
Initial	82 (7)	266 (8)	572 (53)*	—
Year	75 (13)	248 (17)	321 (47)	474 (43)
HSQ (q/f)				
Initial	118 (17)	326 (24)†	495 (70)	486 (27)
Year	91 (15)	234 (19)	342 (52)	436 (40)

* Paired t-test comparing initial to year, $t = 2.89$, $p < 0.02$.
† Paired t-test comparing initial to year, $t = 3.55$, $p < 0.001$.

For the men, whether or not there was a recording of alcohol consumption in the medical notes was not related to changes in alcohol consumption for the whole group or for the treatment or control groups independently. However for the women, there was an independent effect when assessment was made by grouping women into whether or not there was a recording of an alcohol consultation in the medical notes. The results comparing the 17 women who had a recording of one or more alcohol consultations in their notes compared with the 41 women who had no recording of alcohol advice in their notes are shown in Table 4.8. Women who had a recording of one or more alcohol consultations in their notes reduced their alcohol consumption from 36.8 units per week to 11.5 units, whereas women who had no such recording reduced their alcohol consumption from 36.1 units per week to 24.0 units per week. This effect remained in a multiple analysis of variance when controlling the effect of treatment group according to the protocol of the study.

Lifestyle changes during the trial

For both the men and the women, there were no significant changes in reported frequencies of taking exercise, dieting to lose weight, or cigarette consumption over the duration of the trial or between treatment and control groups.

Table 4.6 Changes in clinical findings, men.

	Treatment		Control	
	Initial	Year	Initial	Year
Intention to treat	($n = 80$)	($n = 80$)	($n = 74$)	($n = 74$)
Problem scores (No. (%))				
Abnormal accident score	1 (1.3)	2 (2.5)	6 (8.1)	6 (8.1)
Abnormal social score	20 (25.0)	12 (15.0)	23 (3.1)	14 (18.9)
Abnormal dependence score	33 (41.3)	19 (23.8)	31 (41.9)	27 (36.5)
Abnormal health score*	36 (45.0)	31 (41.9)	28 (35.0)	27 (36.5)
Psychological scores† (Mean (SE))				
Short GHQ	1.3 (0.5)	1.2 (0.4)	2.4 (1.0)	2.5 (0.8)
Life quality	2.5 (0.2)	2.5 (0.2)	2.6 (0.3)	2.6 (0.2)
Affect balance	2.4 (0.4)	2.8 (0.4)	1.9 (0.6)	1.8 (0.6)
Anxiety	24.3 (3.6)	26.5 (3.3)	27.3 (3.1)	24.9 (2.8)
Life satisfaction	58.7 (3.5)	60.5 (2.7)	54.4 (3.7)	52.2 (3.5)
Consultation rates‡ (Mean (SE))				
Consultation rate/year	3.0 (0.4)	3.3 (0.6)	2.7 (0.4)	4.0 (0.6)
Episode rate/year	2.1 (0.3)	1.8 (0.3)	2.6 (0.3)	2.2 (0.3)
Laboratory tests§ (Mean (SE))				
Y-GT (IU/l)	29.6 (3.3)	36.2 (6.6)	35.5 (4.0)	33.7 (4.5)
MCV (fl)	93.7 (0.5)	93.9 (0.5)	93.5 (0.4)	93.2 (0.5)
Breath alcohol (mg/100 ml)	4.0 (1.8)	1.8 (0.9)	4.3 (1.4)	2.2 (0.8)

*See footnote 1 to Table 4.1; †See footnote 2 to Table 4.1
‡See footnote 3 to Table 4.1; §See footnote 4 to Table 4.1

Table 4.7 Changes in clinical findings, women.

	Treatment		Control	
	Initial	Year	Initial	Year
Intention to treat	$n = 33$	$n = 33$	$n = 39$	$n = 39$
Problem scores	No.(%)	No.(%)	No.(%)	No.(%)
Abnormal accident score	1 (3)	0(0)	2 (5)	1 (3)
Abnormal social score	7(21)	5(15)	7(18)	3 (8)
Abnormal dependence score	24(73)	13(39)	16(41)	13(33)
Abnormal health score[1]	19(59)	15(47)	21(54)	18(47)
Psychological scores[2]	Mean(SE)	Mean(SE)	Mean(SE)	Mean(SE)
Short GHQ	4.1(1.6)	5.0(1.9)	4.1(1.9)	2.6(1.2)
Life quality	2.3(0.4)	2.0(0.3)	2.6(0.3)	2.3(0.3)
Affect balance	1.8(0.9)	2.4(0.7)	2.0(0.7)	2.3(0.5)
Anxiety	28.6(5.8)	26.3(4.7)	26.8(4.2)	22.0(4.7)
Life satisfaction	61.3(5.1)	46.4(6.7)	53.3(6.3)	40.6(7.7)
Consultation rates[3]	Mean(SE)	Mean(SE)	Mean(SE)	Mean(SE)
Consultation rate	4.8(0.8)	3.9(0.7)	5.5(0.8)	5.9(1.0)
Episode rate	3.3(0.5)	2.4(0.5)	4.3(0.6)	4.2(0.9)
Laboratory tests[4]	Mean(SE)	Mean(SE)	Mean(SE)	Mean(SE)
Y-GT (IU/L)	16.4(3.2)	16.5(4.1)	22.0(4.0)	17.8(3.2)
MCV (fl)	93.5(0.6)	92.4(0.8)	93.7(0.7)	93.3(0.7)
Breath alcohol (mg/100 ml)	1.4(0.8)	0.3(0.2)	1.7(0.8)	0.3(0.2)

[1]See footnote 1 to Table 4.2; [2]See footnote 2 to Table 4.2
[3]See footnote 3 to Table 4.2; [4]See footnote 4 to Table 4.2

Table 4.8 Influence of alcohol consultation, women.

	1+ Recorded Consultation			No Recorded Consultation		
According to protocol	Initial $n = 17$	Year $n = 14$	Difference	Initial $n = 41$	Year $n = 29$	Difference
Consumption (u/week)	Mean(SE)	Mean(SE)		Mean(SE)	Mean(SE)	
Interview (last week)	36.8(2.9)	11.5(3.1)	25.3	36.1(1.6)	24.0(3.3)	12.1
			anova, f = 5.9, $p < 0.03$			

DISCUSSION

Despite the fact that a lower sample size was achieved than that intended according to calculations of statistical power, intervention by general practitioners resulted in a small but significant reduction both in the quantity of alcohol consumed by the men and in the proportion of male patients drinking excessively. After 12 months when analysed according to intention to treat, the intervention resulted in an excess reduction of 65 g per week for the men when compared with the control group, whether measured by interview or health survey questionnaire. At 12 months the net effect of intervention was a reduction of 13% in the proportion of male at risk drinkers. Although there was a significant reduction in alcohol consumption for the whole female sample, there was no evidence of an independent effect of advice. However, when women were analyzed by whether or not there was a recording of an alcohol consultation in the medical notes, women with a recording of one or more alcohol consultations reduced their alcohol consumption by 250 g of alcohol per week, compared with a reduction of 120 g of alcohol per week for women with no recording.

Reliance on self-reported alcohol consumption as the principal outcome measure is an important methodological problem in studies of this kind. There may well be deception which occurs more in the treatment group than in the control group. Objective markers of consumption including gamma glutamyl transferase activity and mean cell volume were therefore used in this study. Unfortunately, these tests have poor discrimination with regard to alcohol consumption (Chick *et al.* 1981; Papoz *et al.* 1981; Shaper *et al.* 1985) and at the comparatively low levels of consumption of most of the patients in the trial significant changes in drinking behaviour might not have been accompanied by changes in these markers. The study failed to detect any change in gamma glutamyl transferase activity between the treatment and control groups. For the whole sample the correlation coefficient in changes in gamma glutamyl transferase activity with changes in alcohol consumption was 0.15 which was not significant. No other changes were detected in the other clinical findings.

Any independent effect of intervention may have been underestimated because the patients in the control group also reduced their consumption. Some of the reduction in alcohol consumption amongst the control group was likely to have resulted from regression to the mean which would also have occurred in the treatment group. Some of this reduction may have occurred because of the impact of assessment. However, at one year's assessment there were no significant differences between the control group who

received no assessment and the group who received assessment. It is possible that some of the reduction for the women occurred because an appreciable proportion of women in the control group appeared to have received advice to cut down on their drinking. Why this should have occurred is unclear. Data is unavailable as to whether or not the issue of heavy drinking was raised by the women themselves or by their doctors. The lack of evidence for an independent effect of advice for the women could also be explained by the smaller sample size achieved than that intended (type 2 error).

A higher proportion of women in the treatment group (73%) scored abnormal on the dependence score at initial interview, compared with 41% of the control group. This is unlikely to explain the lack of difference between treatment and control groups however, because changes in alcohol consumption were not related to initial dependence scores. No information emerged about factors likely to predict a positive response to intervention. A positive response was not related to any patient characteristics nor to their base line measurements including results of scores of psychological well-being and dependence.

Considerable administration was required to devise the study sample which for the men was 2% of the total questionnaires returned and 29% of those who were eligible for the study. Equivalent figures of the MRC study were 1.1% and 25% respectively (Wallace *et al.*1988). Fifty-two per cent of men invited for the initial assessment interview attended. The equivalent figure for the MRC study was 61%. Male non-participants were heavier drinkers than recruited subjects and may have been less interested in making changes to health-related lifestyles.

The MRC study conducted in the United Kingdom found a slightly greater effect of GP intervention for men when analysed by intention to treat than in the present study and a significant effect of GP intervention for women when analyzed by intention to treat (Wallace *et al.* 1988). At 1-year follow-up a mean reduction in consumption of alcohol of 180 g per week had occurred in the treated men compared with a reduction of 80 g per week in the control group, and a mean reduction in consumption of alcohol of 11 units per week had occurred in the treated women compared with a reduction of 7 units per week in the control group.

CONCLUDING REMARKS

There is sufficient evidence from the present study and the MRC study to recommend systematic screening of patients' alcohol consumption by general practitioners and the giving of advice to those found to be at risk. Recognizing that in the early 1990s, there were very few published studies examining the effectiveness of general practitioners' advice to reduce the risk of alcohol, Chapter 5 will update the evidence base and consider the extent to which the conclusions hold ten years later. The chapter will also explore elements that might contribute to increasing the efficacy of general practitioners' advice, including patient matching, the use of motivational interviewing and the use of pharmacotherapy.

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CHAPTER 5

THE EFFECTIVENESS OF GENERAL PRACTITIONERS' ADVICE: AN UPDATE TEN YEARS ON[1]

ABSTRACT

Aims To identify if the findings of the efficacy trials undertaken during the early 1990s, one of which was reported in Chapter 4, hold ten years on; to consider how the efficacy and effectiveness of general practitioners' advice might be improved through, for example, patient matching, motivational interviewing and the use of pharmacotherapy.

Methods Identification of thirty six individual studies and ten major reviews and meta-analyses through the references of key texts and publications.

Findings Further studies, reviews and meta-analyses have confirmed the effectiveness of brief interventions, suggesting at least a 10% to 16% reduction in alcohol consumption of intervention groups above that of control groups, at least in the short term. It appears that brief interventions are equally effective for both men and women and more effective for less severe drinking problems. Although the evidence is limited, it would appear that brief interventions based in primary health care are highly cost effective. Little is known about predictors of effective treatment. The very large project MATCH failed to confirm the hypothesis that overall outcomes of treatment could be improved when patients were matched to different types of treatment. Although motivational interviewing is commonly proposed as an effective treatment intervention, there is little research evidence to show that it is any more effective compared with other intervention approaches. Although pharmacotherapy seems promising for alcohol dependent patients, it has not been studied to any great extent in primary health care, and its use in general practice remains questionable.

Conclusions There is evidence for the efficacy and cost effectiveness of brief interventions to reduce hazardous and harmful alcohol consumption in general practice settings. Although further research should continue to identify measures to increase their efficacy and effectiveness, the widespread implementation of general practice based interventions would have a significant impact in improving public health. Brief intervention programmes should be integrated into routine clinical general practice.

[1] Based on: Anderson, P. The effectiveness of general practitioners' advice in reducing the risk of alcohol. In: Neil, A., Fowler, G., Mant, D., eds. (In Press). *Prevention of Cardiovascular Disease: An evidence-based approach*. 2nd Ed. Oxford: Oxford University Press.

INTRODUCTION

Although studies undertaken during the early 1990s demonstrated that general practitioners' advice is effective in reducing the risk of alcohol, the evidence base was limited and restricted to efficacy studies. Further, little information was available about predictors of effect. The purpose of the present chapter is to consider the robustness of the findings ten years on, particularly through the results of systematic reviews and meta-analyses.

Research reports from the past 25 years suggested that treatment outcomes could be improved by carefully matching or tailoring individuals, based upon their personal characteristics, to specific therapeutic approaches (Institute of Medicine 1990). Further, it has been suggested that the techniques of motivational interviewing, a directive client-centred style of counselling may enhance effectiveness (Rollnick & Miller 1995). Pharmacotherapy is beginning to find its place in prevention relapse in alcohol dependence, but has only been tested where psychological therapy is also offered (Chick 2001).

The chapter will consider means of increasing the efficacy and effectiveness of general practitioners' advice, including matching or tailoring interventions to particular characteristics of patients, the use of motivational interviewing, and the potential of pharmacotherapy.

METHODS

Reviews and meta-analyses of the relationships between alcohol consumption and risk of harm were identified through the references of key texts (Heather *et al.* 2001; Babor *et al.* submitted for publication), publications in the journals Addiction and Drug and Alcohol review, and the alcohol list serve of the Institute of Alcohol Studies (www.ias.org.uk). The reviews and meta-analyses and their key references were obtained. Information was abstracted from the published papers with particular reference to the robustness of the findings of the study reported in Chapter 4 (Scott & Anderson 1990; Anderson & Scott 1992), evidence for increased efficacy resulting from tailoring or matching interventions to patients, the use of motivational interviewing and the potential of pharmacotherapy.

RESULTS

Thirty six individual studies and nine reviews and meta-analyses were identified, Box 5.1. Nine studies (Acuda 1992; Babor *et al* 1992; Boyadjieva 1992; Ivanets & Lukomskaya 1992; Machona 1992; Rollnick *et al*. 1992; Saunders *et al*. 1992; Serrano *et al*. 1992; Skutle 1992) were part of the World Health Organization Phase II randomized clinical trial of brief interventions in primary health care (World Health Organization 1992; World Health Organization 1996).

Box 5.1 Identified individual studies and reviews and meta-analyses.

Individual studies:
Aalto *et al.* 2000; Aalto *et al.* 2001; Acuda 1992; Antti-Poika *et al*. 1988; Babor *et al.* 1992; Boyadjieva 1992; Chick *et al* 1985; Dimeff 1997; Elvy *et al*. 1988; Fleming *et al*. 1997; Fleming *et al*. 1999; Fleming *et al*. 2002; Gentilello *et al*. 1999; Heather *et al.* 1987; Heather *et al.* 1996; Ivanets & Lukomskaya 1992; Kristenson *et al*. 1983; Kuchipudi *et al*. 1990; Logsdon *et al*. 1989; Machona 1992; Marlatt *et al*. 1998; Nilssen 1991; Ockene *et al*. 1999; Project MATCH Research Group 1998; Richmond *et al*. 1995; Richmond *et al*. 1999; Rollnick *et al*. 1992; Sanchez-Craig *et al.* 1989; Saunders *et al*. 1992; Senft *et al*. 1997; Serrano *et al*. 1992; Skutle 1992; Tomson *et al*. 1998; Watson 1999; Welte *et al*. 1998; Wutzke *et al*. 2002.

Reviews and meta-analyses:
Anderson 1993; Ashenden *et al*. 1997; Bien *et al*. 1993; Dunn *et al*. 2001; Effective Health Care Team 1993; Fiellin *et al.* 2000; Kahan, Wilson & Becker 1995; Moyer, Finney, Swearingen & Vergun 2002a; Moyer *et al.* 2002b; Poikolainen 1999.

The impact of brief interventions

A challenge in summarizing the research literature on the effects of brief interventions stems from varying definitions of such interventions used in different studies. As the term suggests, one defining characteristic of brief interventions is their length. For example, Babor & Grant (1994) termed one contact as 'minimal', one to three sessions as 'brief ', five to seven sessions as 'moderate' and eight or more sessions as 'intensive' treatment. However, what is considered a 'brief' intervention in one study might be considered an 'extended' intervention in another. Other features sometimes used to characterize brief interventions include: (1) having a goal of reduced or non-hazardous or harmful drinking as opposed to abstinence; (2) being delivered by a primary health care physician or other health-care professional as opposed to an addiction specialist; and (3) being directed at non-dependent drinkers as opposed to dependent drinkers.

Heather (1995; 1996) has argued that two broad types of brief interventions should be considered separately. The first type, 'opportunistic' or 'primary care' brief interventions, is made up of interventions typically designed for and evaluated among individuals not seeking alcohol treatment who are identified by opportunistic screening in primary health care settings. Such individuals often have less severe alcohol problems and lower motivation for treatment. These interventions are typically shorter, less structured, less theoretically based and delivered by a non-specialist. The second type, 'specialist' brief interventions, which originated as a control condition in evaluations of traditional treatment has typically been evaluated among individuals seeking or being persuaded to seek treatment for alcohol-related problems. These

interventions are usually longer, more structured, theoretically based and delivered by a specialist.

Heather (1989) also noted that evidence regarding the effectiveness of these two types of brief interventions stems from different research designs. Studies examining opportunistic or primary health care brief interventions typically compare them to a no-treatment control condition, whereas studies examining specialist brief interventions typically compare them to traditional, more extended treatments. For such comparisons of brief interventions with traditional treatment, a difficulty has been 'proving the null hypothesis' (Heather 1989), as the absence of statistically significant differences does not necessarily prove equal efficacy (Mattick & Jarvis 1994), especially with small sample sizes.

The reviews, meta-analyses and individual studies confirmed the findings that brief interventions in primary health care settings are effective in reducing hazardous and harmful alcohol consumption for different population groups and in different countries. The most recent and comprehensive meta-analysis comparing brief interventions, as defined as those providing no more than four intervention sessions, to control conditions found significant effect sizes in changes in alcohol consumption of 0.26 (95%CI, 0.20-0.32) an in changes of alcohol-related problems of 0.24 (95%CI, 0.18-0.30) at 6-12 months follow-up (Table 5.1 and Figure 5.1; reproduced from Moyer *et al.* 2002a). An effect size of 0.26 is equivalent to a 13% improvement of the intervention group compared with the control group, and of 0.24 of a 12% improvement.

Effect sizes were largest at the earliest follow-up points, suggesting decay in intervention effects over time. In addition, because only five of the studies reviewed had follow-ups of greater than 1 year, little is known about the longer-term effects of such brief interventions. Two exceptions to these are the studies by Fleming *et al.* (2002) and Wutzke *et al.* (2002).

Table 5.1 Aggregate effect sizes for brief interventions versus control conditions in non-treatment seeking samples.

				Heterogeneity		
Outcome	*Number of samples*	*Effect size*[a]	*95% confidence interval*	Q	*df*	p
Composite of all drinking-related outcomes						
≤3 months	4	0.300**	0.082, 0.518	4.5	3	0.211
>3–6 months	11	0.144***	0.081, 0.206	10.6	10	0.391
>6–12 months	23	0.241***	0.184, 0.299	30.6	22	0.105
>12 months	5	0.129	–0.007, 0.060	7.4	4	0.188
Alcohol consumption						
≤3 months	3	0.669***	0.392, 0.945	3.6	2	0.164
>3–6 months	11	0.160***	0.098, 0.222	18.5	10	0.048
>6–12 months	20	0.263***	0.203, 0.323	50.8	19	0.000
>12 months	2	0.202	–0.008, 0.412	0.8	1	0.381

[a] Positive values for effect sizes indicate better outcome for brief intervention conditions compared to control conditions.
** $P < 0.01$;
*** $P < 0.001$.

Reproduced from: Moyer *et al.* (2002a).

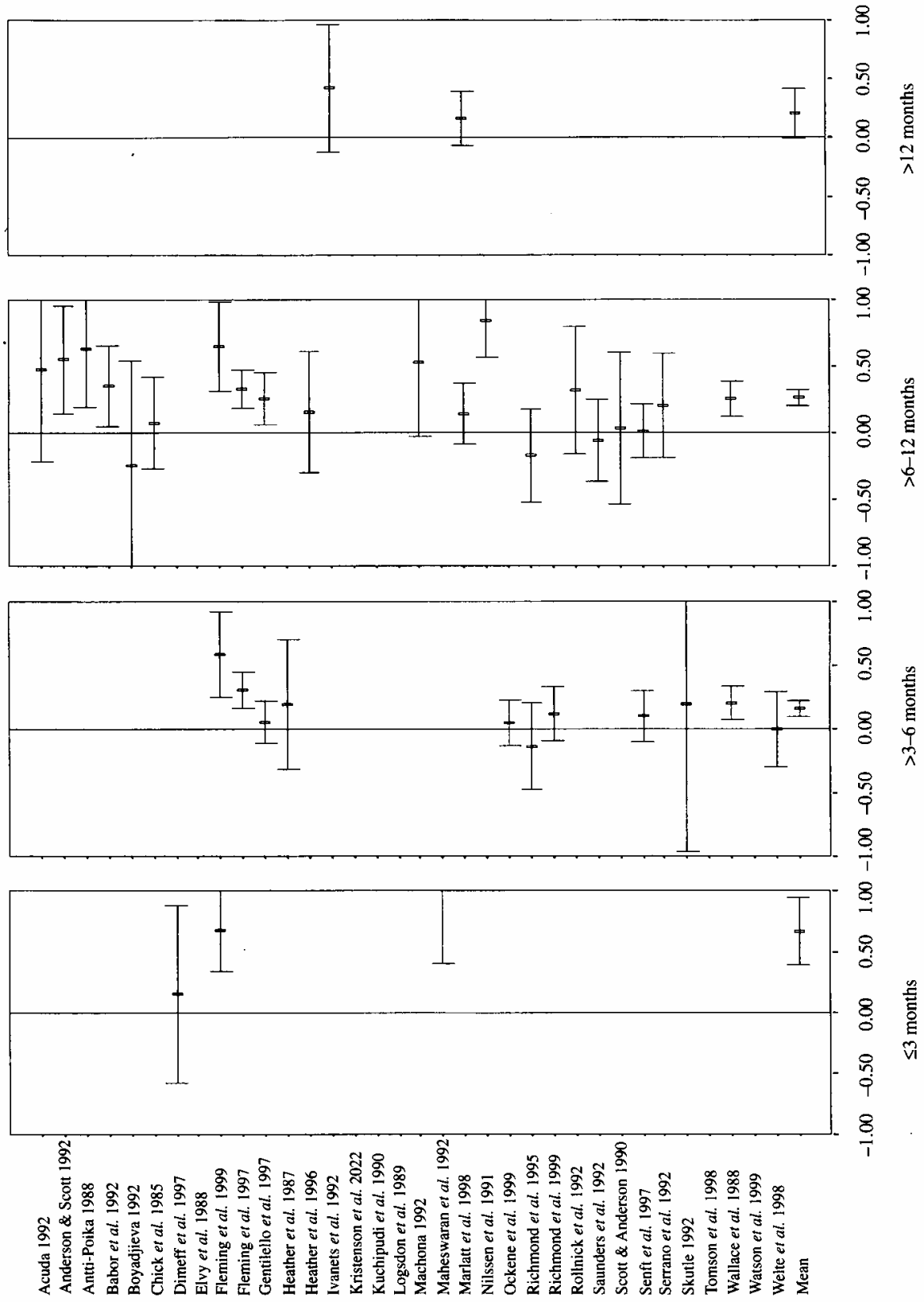

Figure 5.1 Effect sizes and 95% confidence intervals for brief interventions versus control conditions, alcohol consumption.
Reproduced from: Moyer *et al.* (2002a).

The study by Fleming *et al.* (2002) reported a 48 month efficacy and benefit-cost analysis of Project TrEAT (Trial for Early Alcohol Treatment), a randomized controlled trial of brief physician advice for the treatment of problem drinking. Subjects in the treatment group exhibited significant reductions in 7-day alcohol use, number of binge drinking episodes, and frequency of excessive drinking as compared with the control group. The effect occurred within 6 months of the intervention and was maintained over the 48-month follow-up period. The treatment sample also experienced fewer days of hospitalization and fewer emergency department visits.

The study by Wutzke *et al.* (2002) reported the 10 year follow-up of brief and early interventions for hazardous and harmful alcohol consumption. The effectiveness of three forms of intervention, ranging from five to 60 minutes in duration, was compared with a no treatment control condition. Whereas there was an intervention effect at nine months follow-up, no such effect was found at 10 years follow-up, in median consumption, mean reduction in consumption from baseline to follow-up, mortality and ICD 10 diagnoses of alcohol dependence or harmful alcohol use. Between baseline and the nine month follow-up, the intervention groups reduced their median alcohol consumption from 324 to 208 grams per week, a reduction of 116 grams or 36%, compared with the control group which reduced its median alcohol consumption from 309 to 263 grams per week, a reduction of 46 grams, or 15%. At ten year follow-up, the reduction for the intervention group was from 324 to 174 grams per week, 150 grams, or 46% and the control group from 309 to 158, 151 grams, or 49%.

To enhance the effectiveness of brief interventions over the long term, health-care providers might need to provide ongoing monitoring of patients' drinking behaviour and intervene appropriately if drinking again becomes hazardous (Stout *et al.* 1999).

Men and women appear to benefit equally from brief interventions (Moyer *et al.* 2002a). Brief interventions appear to be more effective compared to control conditions in studies where more severely affected individuals are excluded (Moyer, *et al.* 2002a). This finding suggests that such interventions might be useful only for individuals with less severe drinking problems.

There has been very little estimation of the cost effectiveness of primary health care based interventions for hazardous and harmful alcohol consumption. In one US study, the average per subject benefit of intervention was estimated as US$1151, comprised of savings in emergency department and hospital use (US$531) and savings in crime and motor vehicle accidents (US$620) (Fleming *et al.* 2000). The average cost of the intervention was US$205 per subject, representing a benefit cost ratio of 5.6:1. The benefit-cost analysis of the 48 month follow-up suggested a $43,000 reduction in future health care cost for every $10,000 invested in the early intervention (Fleming *et al.* 2002). The benefit-cost ratio increased when including the societal benefits of fewer motor vehicle events and crimes. In an analysis of cost effectiveness in Sweden, Lindholm (1998) estimated that if 10% of those given advice reduced their alcohol consumption over the long term, all the costs of the treatment would be covered by savings in health care expenditure.

Improving effectiveness through patient matching

In a 1990 report, the Institute of Medicine of the US National Academy of Sciences strongly advocated research on patient-treatment matching or tailoring (Institute of Medicine 1990). Although there have not been studies on the effect of patient matching for non-treatment seeking populations with hazardous or harmful alcohol consumption in primary health care settings, project MATCH, was designed to test the general assumption that matching would improve treatment outcomes in specialist settings for alcohol dependent patients, and in particular to test specific matching effects hypothesized on the basis of prior matching findings (Project MATCH Research Group 1993). The trial employed three individually delivered treatments that differed widely in philosophy and practice: (1) a 12-session Twelve-Step Facilitation Therapy (TSF) designed to help patients become engaged in the fellowship of Alcoholics Anonymous; (2) a 12-session Cognitive Behavioural Therapy (CBT) designed to teach patients coping skills to prevent relapse to drinking; and (3) a Motivational Enhancement Therapy (MET) designed to increase motivation for and commitment to change, consisting of four sessions scheduled over 12 weeks.

A total of 1726 individuals, varying widely in personal characteristics and alcohol problem severity, were assigned randomly to the three treatments at sites located in nine communities across the United States. The three treatments were tested in parallel studies in two types of settings: outpatient and aftercare. There were 952 outpatients (72% males), and 774 aftercare patients (80% males) recruited immediately following inpatient or intensive day hospital treatment. Specific a priori hypotheses were derived from previous research to predict which individuals would respond best to the three treatments. The following patient characteristics were investigated: severity of alcohol involvement, cognitive impairment, conceptual level, gender, meaning-seeking, readiness for change, psychiatric severity, social support for drinking, sociopathy, typology classification (Type A, Type B), alcohol dependence, anger, antisocial personality, assertion of autonomy, psychiatric diagnosis, prior engagement in Alcoholics Anonymous, religiosity, self-efficacy and social functioning. Outcome evaluations were conducted at 3 month intervals during the first 15 months of follow-up at all sites. In addition, 39-month follow-ups were completed at the five outpatient sites.

Patients in all three treatment conditions showed major improvement not only on drinking measures, but in many other areas of life functioning as well (Project MATCH Research Group 1997a). The frequency of drinking decreased four-fold from about 25 drinking days per month before treatment to fewer than 6 days per month after treatment. The volume of drinking decreased five-fold from about 15 drinks per day before treatment to about three drinks per drinking day after treatment. Patients showed significant decreases in depression, alcohol-related problems and in the use of other drugs, as well as improvement in liver function. Improvements that occurred during treatment were well maintained throughout the 12 months following the end of treatment. A 39-month follow-up of the outpatient sample indicated continued maintenance of these high abstinence rates (Project MATCH Research Group 1998).

The central purpose of Project MATCH was to determine whether patient treatment matching or tailoring would improve outcome. Of the first 10 matching variables, however, only one a priori prediction was supported (outpatients with few or

no psychological problems had more abstinent days during most of the year following treatment when given twelve-step facilitation treatment than when given cognitive behavioural therapy) and there were relatively few outcome differences among the three different treatments designed to differ dramatically in philosophy and procedures (Project MATCH Research Group 1997a). The results suggested that triaging clients to individual therapy, at least based on the attributes and treatments studied in Project MATCH, is not a requirement for treatment success as previously believed.

One of the reasons put forward as to why Project MATCH, probably one of the largest and statistically most powerful psychotherapy trials ever conducted, failed to confirm the hypothesis that overall outcome of treatment could be improved when patients were matched to different types of treatment is that the most powerful intervention was the research itself (Stockwell 1999). It is reasonable to suggest that with a chronically relapsing condition like alcohol dependence a few therapeutic sessions over 12 weeks will have less long-term impact on drinking than a series of follow-up interviews strategically placed over a 3-year period. Many of the ingredients of what is considered to be an effective motivational intervention are contained in such a series of research interviews, for example, a non-judgemental focus on recent drinking behaviour and related harms and the expectation of this being repeated over an extended time period. Indeed, there was slightly more contact time (5 hours) spent on follow-up assessments over the 3 years of the study than there was in one of the treatments, Motivational Enhancement Therapy (Project MATCH Research Group 1997b). If assessment has a therapeutic benefit then it greatly reduces the possibility of finding matching effects simply because all treatment groups received identical amounts of follow-up assessment.

Although Project MATCH was undertaken in specialist settings for alcohol dependent patients, there is no reason to assume that its main findings are not applicable to general practice settings. Thus, it is unlikely that tailoring interventions to individual clients, at least based on the characteristics studied in Project MATCH, will increase the efficacy of general practice based interventions.

Improving effectiveness with motivational interviewing

It has been proposed that motivational interviewing, originally developed to prepare people to change substance use behaviours (Miller 1983), a directive, client-centred style of counselling that helps clients to explore and resolve their ambivalence about changing behaviours (Rollnick & Miller 1995) might enhance the effectiveness and cost effectiveness of brief interventions. While using client centred techniques to build trust and reduce resistance, the provider focuses on increasing readiness for change (Prochaska & DiClemente 1986), understanding the client's view accurately, avoiding or de-escalating resistance and increasing clients' self-efficacy and their perceived discrepancy between their actual and ideal behaviour (Miller & Rollnick 1991). Whilst a meta-analysis has provided substantial evidence that motivational interviewing is an effective intervention method when used by clinicians who are non-specialists, it is little understood how it works, for whom it works best or whether or not it is superior to other intervention methods (Dunn *et al*. 2001). This question may be answered by the ongoing United Kingdom Alcohol Treatment Trial (see Heather 2001).

Improving effectiveness through the use of pharmacotherapy

Could the effectiveness of general practitioners' advice for hazardous and harmful alcohol consumption be increased through the use of pharmacotherapy (Fielln *et al*. 2000)? Two large trials have demonstrated the efficacy of naltrexone, an opioid antagonist, combined with psychosocial counselling in alcohol-dependent patients (O'Malley *et al*. 1992; Volpicelli *et al*. 1992). For instance, in one of the trials, 34% to 43% of the patients receiving naltrexone relapsed compared with more than 80% of those who received placebo (O'Malley *et al*. 1992). Given the success of naltrexone in alcohol-dependent patients, its efficacy has been evaluated among patients with less severe alcohol problems in three uncontrolled studies (Bohn *et al*. 1994; Kranzler *et al*. 1997; O'Connor *et al*. 1997). O'Connor *et al.* (1997) studied 29 alcohol-dependent patients who received both naltrexone therapy and seven brief counselling sessions administered by primary care practitioners. There were significant differences between the naltrexone group and the counselling group in the proportion of days in which total abstinence was maintained (89% vs. 37%), days abstinent from heavy drinking (97% vs. 49%), drinks per drinking occasion (2.5 vs. 9.5), and serum gamma glutamyl transferase levels (45 vs. 68 U/L).

Four randomized trials that have examined the efficacy of acamprosate, which binds preferentially to GABA receptors and has serotonergic properties and noradrenergic antagonist activity, in the treatment of alcohol dependence found increased abstinence rates in patients who were treated with acamprosate compared with placebo (Lhuintre *et al*. 1990; Soyka & Sass 1994; Paille *et al*. 1995; Sass *et al*. 1996; Whitworth *et al*. 1996). One trial (Soyka & Sass 1994; Sass *et al*. 1996) enrolled 272 alcohol-dependent patients from 12 outpatient psychiatric clinics for treatment with acamprosate or placebo, along with counselling or individual psycho- therapy. At the end of 48 weeks, the absolute abstinence rate was 43% in the acamprosate group and 21% in the control group. There have been no trials of the use of acamprosate in primary health care.

Thus, whilst pharmacotherapy can be effective for alcohol dependent patients, whether or not it can be an effective treatment option for use in general practice settings and for patients with hazardous and harmful alcohol consumption would require very careful assessment and evaluation (Chick 2001). In the meantime, behavioural based therapies probably remain the preferred option.

DISCUSSION

There is now substantial evidence that brief interventions given opportunistically to non-treatment seeking populations in primary health care settings, are effective in reducing alcohol consumption, by between 10% and 16% in the intervention group above that of the control group. Although not a finding across all studies, the effect appears to be the same for both men and women. Little is known about moderators of effect apart from level of severity, where the more the severe the alcohol problem, the less the impact of the intervention. Brief interventions in general practice settings should be targeted at patients with less severe drinking problems and backed up by

regular monitoring and repeated intervention as required. There is very little evidence to determine which interventions might suit which clients or whether or not different intervention techniques such as motivational interviewing will lead to increased efficacy. The very large project MATCH failed to confirm the hypothesis that overall outcome of treatment could be improved when patients were matched to different types of treatment. There has been very limited cost effectiveness research, but such research that has been undertaken would suggest that brief interventions can be highly cost effective. Although pharmacological agents, such as naltrexone and acamprosate can be effective with alcohol use disorders, no randomized controlled trials of their use in primary health care have been undertaken, perhaps largely because their use has been restricted to patients with alcohol dependence and more severe problems, and their use in general practice settings remains questionable.

Efficacy and effectiveness studies

An important distinction needs to be made between 'efficacy' and 'effectiveness' studies (Richmond & Anderson 1994; Holder *et al.* 1999). An efficacy evaluation refers to "the extent to which a specific intervention, procedure, regimen or service produces a beneficial result under ideal conditions" (Last 1995). A frequent criticism of efficacy studies is the extra support and attention that is given to the implementation settings. It is sometimes difficult to avoid the influence of the trial evaluators in, for example, increasing the motivation of the programme providers or influencing the process of the implementation. An effectiveness evaluation is a measure of "the extent to which a specific intervention, procedure, regimen or service when deployed in the field in routine circumstances, does what it is intended to do for a specified population" (Cochrane 1999). Effectiveness evaluations ask if the achieved significant effects of efficacy studies are repeated after the implementation of interventions in non-experimental settings, sometimes referred to as 'daily practice'.

The randomized trial described in chapter 4, although the screening and brief intervention modalities were no different from that which was routinely undertaken in a number of general practices at the time, would have to be described as an efficacy study, because of the motivational impact of the evaluation. Implementing the interventions in a number of different settings and countries as part of the World Health Organization's project on the identification and management of alcohol-related problems in primary health care could be described as effectiveness studies, although even here specially trained health advisers were used to give the interventions (Babor & Grant 1992). Thus, although there is adequate evidence from efficacy studies that brief counselling interventions based in primary health care are effective in reducing hazardous and harmful alcohol consumption, the size of the effect in regular general practice requires continued study.

Improving the quality of the research

The quality of the research has an impact on the validity of the findings. The findings of high quality studies should be treated with more importance than the findings of low quality studies. Moyer and colleagues (Moyer *et al.* 2002b) investigated the methodological characteristics and quality of alcohol treatment outcome studies

during the period 1970 to 1998. The studies were assessed with a 19-item index, with specific weight assigned to each component (Morley *et al.*1996). Overall scores could range from 0 to 28.5. The four domains of methodological rigor and reporting were: (1) sampling procedures and description of participants; (2) specification and provision of treatment; (3) outcome assessments and follow-up procedures; and (4) accuracy of estimates of treatment effects. Weights were designated based on a judgement of the importance of each. Features that contributed to accurate estimates of treatment effects (e.g. random assignment to treatment conditions) were weighted especially heavily.

Methodological quality improved from a score of 8.2 out of a possible 28.5 in the 1970s, to 10.6 in the 1990s. Improvements included reporting the initial number of participants and conducting follow-ups of 12 months or longer. Although the percentage of studies with adequate power also increased overall, the average statistical power of comparative studies to detect a medium sized treatment effect was low (0.54). One of the more dramatic increases was in the proportion of studies that collected evidence to corroborate self-reports of drinking behaviour. Areas that remained poor included: ensuring that follow-up data are collected when respondents are not under the influence of alcohol; testing for differential dropout among treatment groups with respect to participant background characteristics; reporting the number of individuals being treated in the programs from which samples are drawn; noting the reliability and validity of measures used; and conducting process analyses to examine potential mechanisms underlying treatment effects. When judged with the methodological quality index, the randomized controlled trial reported in chapter 4 (Scott & Anderson 1990; Anderson & Scott 1992) scored 27.5 out of a possible total of 28.5. The only area that the trial 'failed' on was that the follow-up was not at least 12 months in length, an item that was assigned one point in the quality index.

One methodological issue that the quality index did not include, and which the trial reported on in Chapter 4 did not take into account, as this was not developed at the time, was statistical analysis to take into account multilevel modelling of the data. The patients in the study were clustered within one of eight general practices. Patients nested within a general practice are considered to be more alike than patients at different general practices, and the analysis needs to take this into account, treating the level of general practice as a random factor (Healey 2001). The consequences of multi-level analysis would be to reduce marginally the likelihood of finding statistically significant results.

CONCLUDING REMARKS

There is evidence for the efficacy and cost effectiveness of brief interventions to reduce hazardous and harmful alcohol consumption in general practice settings. Although further research should continue to identify measures to increase their efficacy and effectiveness, the widespread implementation of general practice based interventions could have a significant impact in improving public health. However, despite the evidence of their efficacy and cost effectiveness, brief intervention programmes are at present rarely integrated into routine clinical general practice. How this situation might be improved is the subject of parts III and IV.

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PART III

THE ATTITUDES OF GENERAL PRACTICE TO REDUCING THE RISK OF ALCOHOL

CHAPTER 6

MEASURING GENERAL PRACTITIONERS' ATTITUDES IN WORKING WITH DRINKERS: THE DEVELOPMENT OF A TOOL[1]

ABSTRACT

Aim To produce a shortened version of the 30 item Alcohol and Alcohol Problems Perception questionnaire as a quick yet meaningful measure of general practitioners' attitudes to working with drinkers, either as a way of measuring change over time or when planning intervention strategies.
Methods Four hundred and sixty seven general practitioners were sent a postal survey enquiring about their management of alcohol problems. Their attitudes towards working with patients with alcohol problems were measured by the alcohol and alcohol problems perception questionnaire (AAPPQ). The responses to the AAPPQ formed the subject of a data reduction technique to form a shortened scale of ten items (ShortAAPPQ or SAAPPQ).
Findings A shortened scale of ten items was identified and was demonstrated to be as valid as the original AAPPQ.
Conclusions It is suggested that the SAAPPQ is a more simple and useful measure of general practitioner's attitudes to working with patients with alcohol problems.

INTRODUCTION

Many of the studies of the 1970s and 1980s, which focused on the attitudes of doctors to patients with alcohol related problems attempted to measure the doctor's perception of the 'alcoholic' patient without attempting to directly elicit how he or she felt about working with such patients (Fisher *et al*. 1975; Chordorkoff 1976). In addition many studies focused on the hospital doctor rather than the general practitioner (Fisher *et al*. 1975; Engs 1982; Musil 1982). Other studies which focused on general practitioners' attitudes towards working with patients with alcohol related problems tended to employ interview rather than questionnaire techniques (Thom & Telles 1984). Such techniques have provided valuable information. However, they are unsuited to population surveys and can be time consuming and expensive.

Although the utility of measuring attitudes can on occasion be questionable, it is well recognized that attitudinal factors play an important role in determining the response of primary care workers to patients with alcohol problems. Their measurement can be valuable not only in terms of evaluating the impact of specific interventions but also in providing information about how to structure such interventions and as a training tool to facilitate discussion.

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The Maudsley Alcohol Pilot Project, which was set up in England in the 1970s to address the task of engaging primary health care providers in the management of the harm done by alcohol found that general practitioners failed to recognize and respond to drinking problems because they felt anxieties about their role adequacy through not having the information and skills necessary to recognize and respond to drinkers; anxieties about their role legitimacy through being uncertain as to whether or how far drinking problems came within their responsibilities; and anxieties about support in their role through having nowhere to turn for help and advice when they were unsure how to or whether to respond (Shaw *et al*. 1978).

Primary health care providers who experienced anxiety about these areas could be defined on the basis of their responses to the Alcohol and Alcohol Problems Perception Questionnaire (Cartwright 1979; Cartwright 1980) as role insecure. Role security measures role adequacy, for example *"I feel I can appropriately advise my patients about drinking and its effects";* role legitimacy, for example, "*I feel I have the right to ask patients questions about their drinking when* necessary"; and role support, for example "*If I felt the need when working with drinkers I could easily find someone with whom I could discuss any personal difficulties that I might encounter*". All three aspects of role insecurity (role adequacy, role legitimacy and support in their role) were found to be caused by deficiencies either in primary health care providers' training or in their working situation. Role insecurity was expressed at the emotional level as therapeutic commitment which measures motivation, for example "*pessimism is the most realistic attitude to take toward drinkers"*; task specific self-esteem, for example "*all in all I am inclined to feel I am a failure with drinkers"*; and work satisfaction, for example "*in general, it is rewarding to work with drinkers"*. The measures of role security and therapeutic commitment are highly correlated and can be combined into an overall attitude score, where a high score measures a more positive attitude towards working with drinkers.

Various versions of the Alcohol and Alcohol Problems Perception Questionnaire (AAPPQ) were used by Cartwright and his colleagues but all contained within them a series of statements about working with clients with alcohol related problems with which the respondent was asked to indicate the extent of agreement on a seven point scale ranging from 'strongly agree' to 'strongly disagree'. For each scale a score is obtained by summing the individual item scores. Reliability and validity data relating to these scales have been reported (Cartwright 1979).

However, the AAPPQ attitude scale comprises 30 items (Table 6.1) and it can appear a little aversive to the physician whose motivation to participate in research is not high. As one of the most frequently commented upon problems in questionnaire surveys for general practitioners has been a low response rate (Cartwright 1979), it appeared to be desirable to produce a shortened version of this scale for use with such subjects. This paper reports the development of such a measure. It is hoped that it will prove of use to those workers who want a quick yet meaningful measure of general practitioners' attitudes to working with drinkers, either as a way of measuring change over time or when planning intervention strategies.

Table 6.1 Statements comprising the original AAPPQ attitude scales.

Role Adequacy	Role Legitimacy	Role Support
1. I feel I have a working knowledge of alcohol and alcohol related problems.	8. I feel I have a clear idea of my responsibilities in helping drinkers.	12. If I felt the need when working with drinkers I could easily find someone with whom I could discuss any personal difficulties that I might encounter.
2. I feel I know enough about the causes of drinking problems to carry out my role when working with drinkers.	9. I feel I have the right to ask patients questions about their drinking when necessary.	13. If I felt the need when working with drinkers I could easily find someone who would help me clarify my professional responsibilities.
3. I feel I know enough about the alcohol dependence syndrome to carry out my role when working with drinkers.	10. I feel that my patients believe I have the right to ask them questions about drinking when necessary.	14. If I felt the need I could easily find someone who would be able to help me formulate the best approach to a drinker.
4. I feel I know enough about the psychological effects of alcohol to carry out my role when working with drinkers.	11. I feel I have the right to ask a patient for any information that is relevant to their drinking problems.	
5. I feel I know enough about the factors which put people at risk of developing drinking problems to carry out my role when working with drinkers.		
6. I feel I know how to counsel drinkers over the long term.		
7. I feel I can appropriately advise my patients about drinking and its effects.		
Motivation	**Task Specific Self-Esteem**	**Work Satisfaction**
15. I am interested in the nature of alcohol related problems and the responses that can be made to them.	20. I feel I am able to work with drinkers as well as others.	26. I often feel uncomfortable when working with drinkers.
16. I want to work with drinkers.	21. All in all I am inclined to feel I am a failure with drinkers.	27. In general, one can get satisfaction from working with drinkers.
17. I feel that the best I can personally offer drinkers is referral to somebody else.	22. I wish I could have more respect for the way I work with drinkers.	28. In general, it is rewarding to work with drinkers.
18. I feel that there is little I can do to help drinkers.	23. I feel I do not have much to be proud of when working with drinkers.	29. In general, I feel I can understand drinkers.
19. Pessimism is the most realistic attitude to take toward drinkers.	24. At times I feel I am no good at all with drinkers.	30. In general, I like drinkers.
	25. On the whole, I am satisfied with the way I work with drinkers.	

METHOD

The sample comprised 467 general practitioners who had a practice address in Oxfordshire and West Berkshire, England. They were sent a postal questionnaire with a free post return envelope during spring 1984. The questionnaire covered four main areas: background information about the doctors; the alcohol consumption of the doctors; the attitudes of doctors to working with drinkers and their beliefs about their own activities in working with drinkers. Three hundred and twelve doctors replied giving a response rate of 67%. Further details of the sample and questionnaire analysis have been reported elsewhere (Anderson 1984). The component of the questionnaire concerned with measuring doctors' attitudes towards working with drinkers consisted of the AAPPQ attitude scale described above.The responses to the attitude scale measures were the subject of a principle factor analysis (Statistical Package for the Social Sciences: PA2). The correlation matrix produced was examined and those statements in the attitude scale which intercorrelated with a coefficient of more than 0.71 were extracted. The variable which was judged more clinically meaningful was returned and the analysis repeated with the smaller number of variables.

The factor analysis was repeated with an oblique rotation, firstly choosing factors with an Eigen value of more than 1.00, and secondly forcing six factors in the rotation.

The factor structure matrix of the six factors was then examined. Those statements with a factor loading of more than 0.3 were extracted for each factor and fed into a stepwise regression analysis to determine the contribution of each statement to the variance of each factor. Where a statement was found to be in two or more factors, the statement was assigned to the factor with the highest loading. The two statements which contributed the highest variance to each factor comprised the new scale of twelve statements.

A composite attitude score was then obtained by summing the responses for all the statements with the exception of role support items which have specific situational determinants that may vary from region to region.

The extent to which the new scale correlated with the old scale (excluding role support items) was examined when those statements comprising the new scale were extracted from the original measure (S.P.S.S.: nonparametric correlation).

In order to test the validity of the composite attitude score from the new scale against the original, Chi square analyses were performed using the variables hours of postgraduate education about alcohol-related matters and frequency of initiation of discussion about alcohol and alcohol-related problems which had been found to be significantly related to the original attitude score (Anderson 1985). Prior to the Chi-square analyses, the distribution of responses of both scales were divided into three sixths (lowest sixth, middle sixth, highest sixth). A low score indicates a more negative attitude and a high score a more positive attitude.

RESULTS

Five pairs of statements within the correlation matrix had a coefficient of more than 0.71, (Table 6.2). Of the five pairs, statements 2, 9, 14 and 28 were judged to be the more clinically meaningful of the pair and were returned for further factor analysis.

Table 6.2 Correlation matrix. Pairs of statements with a correlation coefficient of more than 0.71 (statement numbers as in Table 6.1).

	2	3	4	9	11	13	14	27	28
2	1.00	0.74	0.72	-	-	-	-	-	-
3	0.74	1.00	-	-	-	-	-	-	-
4	0.72	-	1.00	-	-	-	-	-	-
9	-	-	-	1.00	0.78	-	-	-	-
11	-	-	-	0.78	1.00	-	-	-	-
13	-	-	-	-	-	1.00	0.79	-	-
14	-	-	-	-	-	0.79	1.00	-	-
27	-	-	-	-	-	-	-	1.00	0.76
28	-	-	-	-	-	-	-	0.76	1.00

The factor structure matrix, rotating six factors, is shown in Table 6.3. Factor 1 accounted for 49.8% of the variance, factor 2 for 15.0%, factor 3 for 13.3%, factor 4 for 8.9%, factor 5 for 7.1% and factor 6 for 5.8%. The stepwise regression analysis is shown in Table 6.4.

The two statements which contributed the highest variance to each factor in Table 6.4 comprised the shortened version of the alcohol and alcohol problems perception questionnaire (SAAPPQ) (excluding the two role support questions which are situational specific):

2. I feel I know enough about the causes of drinking problems to carry out my role when working with drinkers.
7. I feel I can appropriately advise my patients about drinking and its effects.
23. I feel I do not have much to be proud of when working with drinkers.
21. All in all I am inclined to feel I am a failure with drinkers.
16. I want to work with drinkers.
19. Pessimism is the most realistic attitude to take toward drinkers.
9. I feel I have the right to ask patients questions about their drinking when necessary.
10. I feel that my patients believe I have the right to ask them questions about drinking when necessary.
28. In general, it is rewarding to work with drinkers.
30. In general, I like drinkers.

Table 6.3 Factor structure matrix following factor analysis with oblique rotation forcing 6 factors (statement numbers as in Table 6.1).

Statements	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
1	0.75	-0.23	0.10	-0.16	-0.30	0.17
2	0.77	-0.19	0.00	-0.11	-0.30	0.16
5	0.69	-0.21	0.13	-0.30	-0.33	0.21
6	0.65	-0.32	0.08	-0.18	-0.33	0.22
7	0.51	-0.23	0.04	-0.40	-0.30	0.26
8	0.55	-0.23	0.11	-0.40	-0.30	0.37
9	0.20	-0.20	0.15	-0.82	-0.28	0.14
10	0.14	-0.09	0.01	-0.66	-0.18	0.15
12	0.31	-0.09	0.08	-0.24	-0.71	0.04
14	0.29	-0.19	0.07	-0.24	-0.92	0.21
15	0.33	-0.11	0.79	-0.24	-0.24	0.39
16	0.28	-0.29	0.65	-0.20	-0.17	0.64
17	-0.48	0.54	-0.16	0.30	0.24	-0.28
18	-0.23	0.66	-0.38	0.24	0.17	-0.37
19	-0.02	0.47	-0.49	0.09	0.13	-0.20
20	0.35	-0.37	0.38	-0.25	-0.26	0.48
21	-0.30	0.65	-0.19	0.09	0.19	-0.11
22	-0.29	0.66	0.05	0.15	0.14	-0.29
23	-0.25	0.72	0.07	0.10	0.11	-0.26
24	-0.08	0.49	-0.10	0.11	0.13	-0.08
25	0.46	-0.56	-0.16	-0.18	-0.17	0.44
26	-0.19	0.53	-0.11	0.24	0.13	-0.23
28	0.21	-0.33	0.47	-0.15	-0.18	0.65
29	0.44	-0.22	0.12	0.22	-0.22	0.60
30	0.06	-0.17	0.17	-0.18	-0.17	0.67

The correlation between the new scale and the old scale (excluding the role support questions) was 0.78 ($P<0.001$). Table 6.5 shows that the distributions of the original scale and the shortened version by hours of postgraduate education about alcohol-related matters were very similar. Table 6.6 shows that the distribution of the frequency of initiation of discussion about alcohol and alcohol related matters with patients by the original scale and by the shortened version were also very similar.

Table 6.4 Cumulative R square values of statements following stepwise regression analysis within each of six factors (statement numbers as in Table 6.1).

FACTOR 1	**FACTOR 2**	**FACTOR 3**	**FACTOR 4**	**FACTOR 5**	**FACTOR6**
2* 0.60	**23* 0.56**	**16* 0.68**	**9* 0.80**	**14* 0.81**	**28* 0.60**
7* 0.80	**21* 0.72**	**19* 0.92**	**10* 1.00**	**12* 0.95**	**30* 0.79**
6 0.89	26 0.82	15 1.00			20 0.91
5 0.94	25 0.88				29 1.00
8 0.97	17 0.92				
1 1.00	24 0.96				
	18 0.98				
	22 1.00				

* The two statements contributing to the highest variance for each factor are highlighted in bold

Table 6.5 Distributions of the original scale and the shortened version divided into three sixths (lowest sixth, middle sixth, highest sixth) by hours of postgraduate education about alcohol-related matters.

	Hours of post graduate educatio n about alcohol-related matters		
Original AAPPQ	Less than 4	4-10	11 or more
	n94	n23	n19
	%	%	%
Lowest sixth	41	14	11
Middle sixth	38	43	26
Highest sixth	21	43	63

χ^2=18.9; DF=4; P<0.001
Correlation AAPPQ and hours of postgraduate education = 0.25 (P<0 .001)

	Hours of post graduate education about alcohol-related matters		
Short version	Less than 4	4-10	11 or more
	n77	n31	n17
	%	%	%
Lowest sixth	47	16	11
Middle sixth	30	42	24
Highest sixth	23	42	65

χ^2=18.4; DF=4; P<0.01
Correlation short scale and hours of postgraduate education = 0.22 (P<0.001)

Table 6.6 Frequency of initiation of discussion about alcohol and alcohol-related problems by the original scale and the shortened version divided into three sixths (lowest sixth, middle sixth, highest sixth).

	Composite score		
Original AAPPQ	Lowest sixth	Middle sixth	Highest sixth
Frequency of discussion	n44	n51	n41
	%	%	%
Once a week or more	30	51	61
Once a month	36	29	32
Less often	34	20	7

χ^2=12.4; DF=4; P<0.025
Correlation AAPPQ and frequency = 0.25 (P<0.001)

	Composite score		
Short version	Lowest sixth	Middle sixth	Highest sixth
Frequency of discussion	n44	n41	n41
	%	%	%
Once a week or more	34	59	66
Once a month	43	24	27
Less often	23	17	7

χ^2=12.1; DF=4; P<0.025
Correlation short scale and frequency = 0.22 (P<0.001)

DISCUSSION

The factor analysis reduced the statements to six groupings similar to the six scales of the original AAPPQ. The study thus confirmed Cartwright's original findings. Factor one was equivalent to role adequacy, two to task specific self-esteem, three to motivation, four to role legitimacy, five to role support and six to work satisfaction. There was some overlap however of the task specific self-esteem and motivation scales between factors two and three. Factor one, role adequacy, accounted for half of the variance of the whole scale, suggesting that the general practitioner's perception of the adequacy of his or her own knowledge base is a crucial variable in terms of their overall attitude to working with drinkers. Despite the obvious importance of role adequacy, however, it was decided to maintain the original distinctions of Cartwright's six scales when devising the shortened measure, because of their conceptual and clinical value.

The new scale was found to have a high degree of correlation with the old scale and the validity of the new composite attitude score was demonstrated by comparing both the new and old scales with other responses within the original study. The use of factor-analytic techniques enabled it to be seen whether some underlying pattern of relationships existed in the overall attitude scale such that the data could be 'reduced' to a smaller set of factors that may be taken as source variables accounting for the observed interrelations in the data. It was also undertaken in order to examine whether the AAPPQ variables on this occasion conformed to the same structure as that observed by Cartwright when using the responses of a more heterogeneous sample of subjects (Cartwright 1980). Its primary use, however, was as the first stage in a data-reduction technique to identify those variables to be included in the proposed shortened attitude measure. Principle factor analysis (SPSS: PA2) was chosen rather than a principle components analysis because the assumption was made that the observed variables were influenced by various determinants some of which were shared by other variables in the set while others were not shared by any variable. This assumption was based on work which has shown that factors such as education about alcohol problems and experience in working with drinkers are significantly related to several of the attitude scales under study but not to all (Cartwright 1979; Anderson 1985; Clement 1986). The principal components analysis assumes that all variance in the correlation matrix is common variance, the effect of inserting unities into the correlation matrix. This assumption however violates classical test theory (Nunnally 1972) which splits variance into true test variance, specific variance and error. Principle factor analyses avoid this assumption. It should be noted, however, that in practice the alternative models often produce quite similar results with empirical data if the data is not in the form of dichotomous items (Gorsuch 1974).

The correlation matrix produced was examined and those variables which inter-correlated with a coefficient of more than 0.71 were extracted. The variable which was judged more clinically meaningful was returned and the analysis repeated with the smaller number of variables. This was done in an effort to exclude those variables which measured very similar phenomenon but which would both show high loadings on a given factor. Comfrey (1978) had recommended this strategy in order that each variable with a high loading on a factor has a logically distinct and separate identity, measuring something that is not the same as that which is being measured by any other

variable in the factor. Following this, the factors were rotated in an effort to reach simple structure.

Cattell (1978) had shown that whether or not simple structure is obtained depended on the number of factors in the rotation. If too many are rotated, factors tend to split and any clear structure becomes obscured. The nature of the rotation [oblique or orthogonal] will depend upon whether the factors are felt to be correlated or uncorrelated. Because there was held to be a substantial degree of correlation between the original attitude sub-scales and because it had been argued by Cattell (1978) that orthogonal solutions were not as psychologically meaningful as oblique rotations, an oblique rotation was chosen of those factors with an eigen value of more than 1.00. On examination it was felt that this had resulted in the rotation of too many factors (N7). In order to overcome this problem the analysis was repeated but on this occasion it was specified that only 6 factors should be rotated (SPSS keyword NFACTORS was used) in order that simple structure be resolved.

CONCLUDING REMARKS

The shortened version of the original attitude scale has been demonstrated to be representative of and as discriminatory as the old scale. It is hoped that this new scale will prove useful to those researchers and programme implementers who want a quick yet meaningful measure of general practitioners' attitudes to working with drinkers and to those educators who have need of a tool for examining practitioners' attitudes in training settings. In the next chapter, the scale is used to measure the attitudes of 1300 general practitioners studied as part of a World Health Organization collaborative project on the identification and management of alcohol-related problems in primary health care, to determine the relationships between education on alcohol, a supportive working environment, the general practitioners' attitudes and the number of patients they manage for alcohol related problems.

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CHAPTER 7

ATTITUDES AND MANAGING ALCOHOL PROBLEMS IN GENERAL PRACTICE: A DESCRIPTIVE STUDY[1]

ABSTRACT

Aim To determine if general practitioners' recalled experience of education on alcohol, support in their working environment, perceptions of role security and therapeutic commitment have an impact on the number of patients that they manage with alcohol problems.

Method Thirteen hundred general practitioners from nine countries were surveyed as part of a World Health Organization collaborative study on brief interventions for hazardous and harmful alcohol use. A postal questionnaire included self-reported measures of post-graduate education and training on alcohol and related problems; measures of a supportive working environment; measures of role security and therapeutic commitment; and numbers of patients managed for alcohol-related problems in the last year.

Findings General practitioners who recalled receiving more education on alcohol (OR=1.5; 95%CI, 1.3-1.7), who perceived that they were working in a supportive environment (OR=1.6; 95%CI, 1.4-1.9), who expressed higher role security (OR=2.0; 95%CI, 1.5-2.5) and who reported greater therapeutic commitment (OR=1.4; 95%CI, 1.1-1.7) were more likely to manage a greater number of patients with alcohol-related harm. Education on alcohol and working in a supportive environment were associated with higher role security and therapeutic commitment.

Conclusions Although caution should be exercised in the interpretation of these results, which were derived from a cross-sectional self report survey, it does appear that to enhance the involvement of general practitioners in the management of alcohol problems a combination of both education and support in the working environment leads to a greater impact than simple education alone.

INTRODUCTION

The Institute of Medicine (1990), in its report 'Broadening the Base of Treatment' noted that alcohol consumption and its associated problems exist within a continuum. Alcohol consumption ranges from no or light consumption through to heavy consumption, and alcohol-related problems range from none through to substantial or serious harm. There is a relationship between consumption and harm, with increasing alcohol consumption increasing the risk of harm (Anderson *et al*. 1993; Anderson 1995; see Part II). 'Broadening the Base' also noted that, just as there is a

[1] Based on: Anderson, P., Kaner, E. Wutzke, S, Wensing, M., Grol, R., Heather, N. & Saunders, J. Attitudes and management of alcohol problems in general practice: descriptive analysis based on findings of a WHO international Collaborative Survey (submitted for publication).

continuum of both alcohol consumption and related harm, so there is a continuum of responses to such harm, ranging from primary prevention through brief interventions to specialized treatment. In other words, there is a need for a broad spectrum of interventions that matches the broad spectrum of harm (Heather 1995). The specialized sector cannot be the sole point of treatment. Furthermore, if alcohol-related harm is to be reduced significantly, its distribution in the population suggests that a principal focus for intervention should be people with mild or moderate harm (Kreitman 1986; Rose 1993).

There has been an increasing emphasis on the role of primary health care in the prevention and management of alcohol-related harm (Babor *et al*. 1986; Anderson 1996; Babor & Higgins-Biddle 2000). However, despite the evidence for the effectiveness and cost effectiveness of brief interventions in primary health care (Anderson 1993; Effective Health Care Team 1993; Moyer *et al.* 2002; see Part III), such interventions have yet to be integrated into routine clinical practice (Heather 1996; Brotons *et al*. 1996; Gomel *et al*. 1998; Spandorfer *et al*. 1999; Rumpf *et al.* 2001; Aalto *et al.* 2001). General practitioners find alcohol a difficult issue, and they frequently lack the skills and the confidence necessary to provide preventive advice or even to screen effectively (Anderson 1985; Clement 1986; Thom & Tellez 1986; Dickinson *et al*. 1989; Ockene *et al*. 1990; Sallis *et al*. 1990; Roche & Richard 1991; Roche *et al*. 1991; Rabin 1993; Schofield *et al*. 1994; Roche *et al*. 1996; Deehan *et al*. 1998). In the 1970s, the Maudsley Alcohol Pilot Project proposed that the key to increasing experience and effectiveness was to provide both education and training to primary health care providers along with a supportive working environment to improve their role security and their therapeutic commitment (Shaw *et al*. 1978).

Data from a World Health Organization collaborative study on brief interventions for hazardous and harmful alcohol use (Anderson 1996; Monteiro & Gomel 1998; McAvoy *et al.* 2000) provided the opportunity to test the relationship of general practitioners' views on education and training, a supportive working environment and their role security and therapeutic commitment on their experience of managing alcohol related problems. The hypotheses to be tested were that high scores on the general practitioners' education on alcohol, on their perceptions of a supportive working environment and on their role security and therapeutic commitment are associated with a greater number of patients managed for alcohol problems; and that high scores on the general practitioners' education on alcohol, and on their perceptions of a supportive working environment are associated with high scores on their role security and therapeutic commitment (Figure 7.1).

METHODS

The findings reported in this paper are derived from data collected in Strand I of the third phase of the World Health Organization collaborative study on brief interventions for hazardous and harmful alcohol use (Anderson 1996; Monteiro & Gomel 1998), which aimed to assess the extent of postgraduate education and training on alcohol experienced by general practitioners, their views and attitudes towards the management of alcohol problems, their diagnostic performance and their reported management of alcohol-related problems. The survey was conducted in 14 countries

world wide although not all administered the full instrument. The analyses reported in this chapter are restricted to Australia, Belgium, Canada, England, France, Italy, New Zealand, Norway and Portugal, the nine countries of the collaborative study that had complete data on the variables of interest.

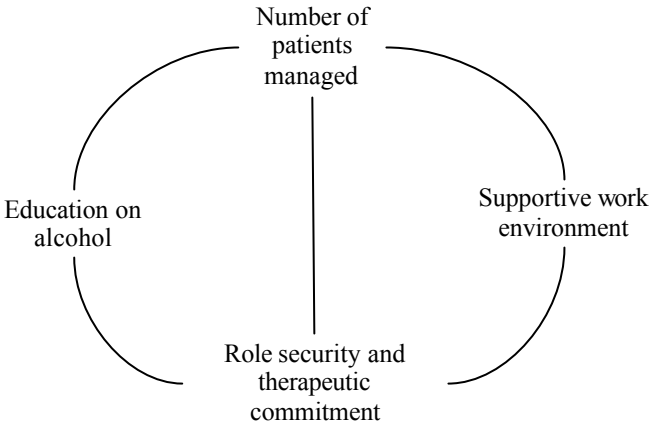

Figure 7.1 Hypotheses to be tested.

Participants

The general practitioners were representative random samples selected from databases of practitioners maintained by national or regional health authorities or by academies and associations of general practitioners in each of the countries (Saunders & Wutzke 1998). Self-completion questionnaires were posted to general practitioners in 1994 together with instructions for completion of the questionnaire and a reply-paid envelope[2]. In seven countries (Australia, Belgium, Canada, England, France, Italy, and New Zealand) non-responding general practitioners were telephoned two-weeks after questionnaires were posted to encourage them to respond. In three countries (Belgium, England and Norway) up to two further questionnaires were posted out to non-responding general practitioners to encourage them to participate in the study. Attempts were made to obtain a final sample of at least 200 general practitioners per country randomly selected after stratification for age, gender, activity level of the general practitioner and socio-economic status of the practice area, where possible. Only one general practitioner per practice was selected for participation in the study.

Questionnaire and preparing variables for analysis

The questionnaire was developed by the Coordinating Centre of the Phase III WHO study in Sydney, Australia (Saunders & Wutzke 1998). The core version was translated into the national language of each participating country, and independently

[2] See Annexe 1, WHO Collaborative Study Questionnaire for General Practitioners (Phase III, Strand 1).

back-translated into English to check accuracy of the initial translation, both literally and idiomatically.

The number of patients managed for alcohol problems in the previous year was classified on a self-reported ordinal scale, none, 1-6, 7-12, 13-24, 25-49 and 50 or more (Question 29 of Annexe 1). Following the method adopted by Anderson (1985), general practitioners were grouped into those who managed seven or more patients in the previous year and those who managed less than seven patients in the previous year, including non-respondents.

Education and training was classified on a self-reported ordinal scale, none, less than 4 hours, 4-10 hours, 11-40 hours and more than 40 hours (Question 10 of Annexe 1). Following the method adopted by Anderson (1985), general practitioners were grouped into those with four or more hours of education on alcohol and those with less than 4 hours, including non-respondents and those who indicated 'don't know'.

A supportive working environment was measured by four items that resulted from a factor analysis of 18 statements measuring views as to why general practitioners might spend very little or no time at all on early intervention for alcohol problems (Question 31 of Annexe 1). The factor analysis was undertaken with SPSS version 10, varimax rotation, and eigen value > 1.0. The four items measured the availability of suitable screening materials; the availability of suitable counselling materials; training in counselling; and the availability of help with handling difficult family and social problems (Cronbach's standardized item alpha0.76). Individual missing values for any of the items of the factor were assigned the mean value of the remaining items of the factor before being summed. Responses to the four statements comprising the factor were summed. General practitioners were grouped as those with a supportive working environment (the top half of the total possible score) and those with a non-supportive working environment (the bottom half of the total possible score).

Role security and therapeutic commitment were measured by responses to the short form of the Alcohol and Alcohol Problems Perception Questionnaire (Anderson & Clement 1987; see Chapter 6) (Question 26 of Annexe 1). The questionnaire included five domains, two of role security and three of therapeutic commitment. Individual missing values for any of the items of the domains were assigned the mean value of the remaining items of the domains before being summed. General practitioners were grouped into those with higher role security and therapeutic commitment (a score higher than the median value for each scale) and those with lower role security and therapeutic commitment (a score including and lower than the median value for each scale).

Analysis

The whole dataset was combined and analyzed at the level of the individual general practitioner. Multilevel logistic regression analyses were used to test for interactions and to calculate odds ratios (OR) with 95% confidence intervals, with country as a nesting random factor, using SASv6.12, macro:glimmix. The regression analyses were controlled for the gender of the general practitioner, the age of the general practitioner and the total number of general practice patients the general practitioners reported that they saw in an average week (Questions 3,4, and 9 of Annexe

1). Multilevel analysis was used because the general practitioners were grouped within countries and general practitioners within one country were expected to be more alike than general practitioners in different countries. Ignoring this grouping in the analysis is likely to provide an overestimate of the error variance and thus possible erroneous conclusions (Healy 2001). The odds ratio is the odds of an event in an intervention group divided by the odds of an event in a non-intervention group (Deeks & Altman 2001). An example in this study would be the odds of having high role security/therapeutic commitment in the presence of high education divided by the odds of having high role security/therapeutic commitment in the presence of low education.

RESULTS

The distribution of the variables by country is shown in Table 7.1.

Table 7.1 Distribution of self-reported variables by country.

Country	GPs (n) Response (%)	Scoring high on number of patients managed for alcohol problems	Scoring high on education and training on alcohol	Scoring high on a supportive working environment	Scoring in top half of possible score for role security	Scoring in top half of possible score for therapeutic commitment
Australia	88 (59%)	44.3%	47.7%	33.0%	83.0%	28.4%
Belgium	93 (47%)	41.9%	22.6%	36.6%	82.8%	21.5%
Canada	169 (50%)	55.0%	53.3%	25.4%	88.8%	29.0%
England	*279 (65%)	32.6%	46.9%	47.6%	80.8%	19.2%
France	166 (85%)	57.8%	27.7%	18.7%	81.9%	33.1%
Italy	150 (38%)	44.0%	38.0%	20.6%	82.7%	32.7%
New Zealand	136 (71%)	39.0%	44.1%	14.3%	86.0%	29.4%
Norway	168 (55%)	55.4%	49.4%	29.4%	88.1%	25.6%
Portugal	51 (51%)	54.9%	62.7%	25.9%	74.5%	27.5%
Total	*1300 (56%)	46.6%	43.1%	27.1%	83.9%	27.1%

*55 general practitioners from the English sample were removed from the subsequent analysis, since they had not completed the attitude questionnaire.

The overall response rate was 56%. There were no differences in age, gender, and activity level of the general practitioner between the respondents and non-respondents. Two fifths (43.1%) of the general practitioners scored high on education and training on alcohol, just over one quarter (27.1%) of the general practitioners scored high on the perception that they were working in a supportive environment, and nearly one half (46.6%) had managed seven or more patients in the past year. Whilst four fifths (83.9%) of the general practitioners felt secure in their role, only one quarter (27.1%) felt therapeutically committed. Calculations of the intra-class correlations estimated that 3.2% of the variance in the number of patients managed was explained by the country of the general practitioner. Seven per cent of the variance of education on alcohol, 3.0% of the variance of role security and therapeutic commitment and 6.6%

of the variance of a working environment perceived as supportive was explained by the country of the general practitioner.

Both education on alcohol and a supportive working environment were independently related to the number of patients managed for alcohol-related harm (Figure 7.2). Role security and therapeutic commitment, which were influenced by both education on alcohol and a supportive working environment, were independently related to the number of patients managed. There was no interaction between education on alcohol, a supportive working environment and role security and therapeutic commitment in their relationship with the number of patients managed. The odds ratio for the number of patients managed was 2.2 (95%CI, 1.4-3.0) for general practitioners who scored high on education on alcohol, high on a supportive work environment and high on role security and 1.8 (95%CI, 1.2-2.4) for general practitioners who scored high on education on alcohol, high on a supportive work environment and high on therapeutic commitment as opposed to those who scored low on these variables.

When the logistic regression analyses were rerun within the nine individual countries, the results were found to remain consistent within the overall analyses (results not shown).

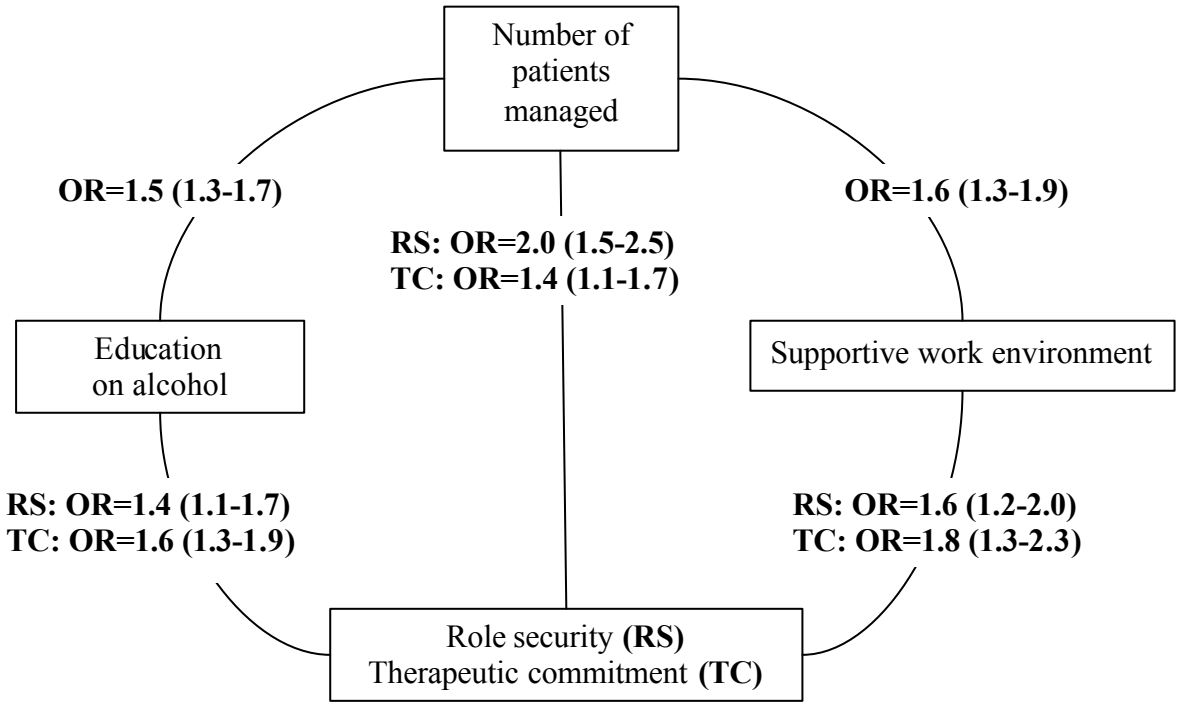

Figure 7.2 Odds ratios (and 95% CI) for the number of patients managed for alcohol problems.
[Multilevel logistic regression analyses with country as a nesting random factor, using SASv6.12, macro:glimmix, controlling for the gender of the general practitioner, the age of the general practitioner and the total number of general practice patients the general practitioners reported that they saw in an average week. Interactions were tested between all the independent variables].

DISCUSSION

The hypotheses of Figure 7.1 were confirmed. High scores on the general practitioners' education on alcohol, on their perceptions of a supportive working environment and on their role security and therapeutic commitment were associated with a greater number of patients managed; high scores on the general practitioners' education on alcohol and on their perceptions of a supportive working environment were associated with higher role security and therapeutic commitment. There was no evidence of interactions between any of the independent variables. In the presence of high education on alcohol, a high supportive work environment and high role security and therapeutic commitment, the odds ratio for a high number of patents managed was 2.2 and 1.8 for role security and therapeutic commitment respectively.

As a whole, the general practitioners had limited experience in training in the management of alcohol problems. Only two fifths of general practitioners stated that they had received four or more hours of postgraduate training or continuing medical education on alcohol in the past. Whilst four fifths of the general practitioners felt secure in their role, only just over one quarter felt therapeutically committed or that they were working in a supportive environment.

Strand 1 of the third phase of the World Health Organization collaborative study on brief interventions for hazardous and harmful alcohol provided a sample of 1300 general practitioners across nine high income countries. The use of representative sample pools and the random sampling of subjects into the survey attempted to ensure that the general practitioners would be typical of practitioners within each country. However, despite attempts to maximize the number of responding general practitioners in each country, there was a variable response rate across the countries, with an overall response rate of 56%. Although the non-responders may have differed in characteristics to those who responded (McAvoy & Kaner 1996) in terms of interest and experience in the management of alcohol problems, the respondents and non-respondents were similar in age, gender, and activity level.

The measures were self-reported, which may have made them prone to socially desirable responding (Oppenheim 1992), for example by reporting more positive attitudes towards working with drinkers or stating a higher number of patients managed for alcohol related problems. An attempt was made to minimize this type of bias by ensuring anonymity and confidentiality to general practitioner respondents, and by providing them with 'don't know/can't remember' options in a number of the responses. The survey was cross sectional in nature, allowing for no inferences of paths of causality. It could be, for example, that, whereas more positive attitudes predicted a larger number of patients managed, a larger number of patients managed could have led to more positive attitudes.

Despite the methodological reservations, and therefore caution in interpreting the results, the perceptions of the general practitioners themselves would suggest that, in order for primary health care to fulfil its potential, both education and training and the creation of a supportive work environment to ensure role security and therapeutic commitment need to be provided (Deehan *et al*. 1998), a finding consistent with the conclusions of the Maudsley Alcohol Pilot Project (Shaw *et al*. 1978).

This study did not address the elements of effective education, although analyses reported elsewhere indicated that education was not only related to the number of patients managed, but also to the practitioners' diagnostic and clinical management skills as assessed by responses to standardized case vignettes (Kaner *et al.* 2002). A supportive work environment was defined in this study as one in which general practitioners regarded screening and counselling materials, training in counselling and help in dealing with difficult situations as being available. This is consistent with the evidence that supports the value of on-site support agents, for example facilitators (Fullard *et al*. 1987) to act as role models, coaches and colleagues in shared care arrangements for dealing with more difficult areas of care such as the management of alcohol problems (Richmond & Anderson 1994; Rush *et al*. 1995; Roche 1996).

CONCLUDING REMARKS

Although caution should be exercised in interpreting the results, which derived from a cross-sectional self report survey, general practitioners who reported managing a higher number of patients with alcohol problems stated that they had received more education on alcohol, expressed increased security and therapeutic commitment in their role and perceived that they were working in a more supportive environment. A supportive working environment was one in which screening and counselling materials, training and support with difficult cases were all available. Chapter 8 of Part IV will examine the effectiveness of different strategies to engage general practitioners in the management of alcohol problems. Chapter 9 will study whether or not role security and therapeutic commitment affect the impact that practice based training and support has on general practitioners' screening and counselling rates for hazardous and harmful alcohol consumption.

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PART IV

INVOLVING GENERAL PRACTICE IN REDUCING THE RISK OF ALCOHOL

CHAPTER 8

ENGAGING GENERAL PRACTITIONERS IN THE MANAGEMENT OF ALCOHOL PROBLEMS: RESULTS OF A META-ANALYSIS[1]

ABSTRACT

Aim A systematic review of studies testing the effectiveness of different strategies to engage general practitioners in managing alcohol problems; identification of predictors of effect; and reporting cost and cost effectiveness data.
Methods MEDLINE; EMBASE; Cinahl; and the Cochrane Library (1966-2001). Inclusion criteria of the Effective Practice and Organisation of Care Group of the Cochrane Collaboration were used. A meta-analysis, using a random effects model, of 15 programmes identified in twelve trials. Effect sizes, calculated using the logged odds ratio, were adjusted by inverse variance weights to control for studies' sample sizes.
Results The weighted mean effect size (0.73; 95%CI, 0.56-0.90) was heterogeneous. Regression analysis using a weighted random effects model to explain the heterogeneity found a significant effect for alcohol specific programmes as opposed to general prevention programmes in which alcohol was included and for multi-faceted programmes as opposed to single faceted programmes, explaining 73% of the variation in effect size between studies. No significant differences were found between professionally based or organizationally based interventions. The average screening and counselling rates were 45% (95%CI, 33%-56%) for the intervention groups and 32% (95%CI, 20%-43%) for the comparison groups, a difference of 13% (95%CI, 8%-18%).
Conclusions Although, due to the small numbers of programmes caution should be used in interpreting the results, it seems that it is possible to increase the engagement of general practitioners in the management of alcohol problems, with outcomes similar in size to those of other studies that have attempted to change health care providers' behaviour in giving smoking cessation advice and in delivering clinical prevention. Although considerably more research of high quality is needed, promising programmes are those that have a specific focus on alcohol, and that are multifaceted.

INTRODUCTION

Alcohol is a risk factor for a wide range of physical and social harm, with the risk of harm increasing with the volume of alcohol consumption, the frequency of heavy drinking occasions and the volume of alcohol consumed during each drinking occasion (Anderson *et al*. 1993; Anderson 1995; Corrao *et al*. 1999; see Part I). Estimates have suggested that at any one time at least 11% of the adult population in the

[1] Based on: Anderson, P., Laurant, M., Kaner, E., Grol, R. & Wensing, M. Engaging general practitioners in the management of alcohol problems: Results of a meta-analysis (submitted for publication).

United States (Curry *et al.* 2000) and at least 30% of the adult population in European countries are drinking alcohol at hazardous or harmful levels (World Health Organization 2001).

There is considerable evidence for the efficacy of general practice based screening and brief intervention programmes to reduce the risk of alcohol (Babor *et al.* 1986; Anderson 1993; Fiellin *et al.* 2000a; Fiellin *et al.* 2000b), with 5-10 minutes of advice leading to at least a 10% to 16% reduction in alcohol consumption compared with control groups (Moyer *et al.* 2001; see Part II). Although these intervention rates might seem low, they are important because the evidence suggests that such interventions are highly cost effective (Effective Health Care Team 1993).

Despite the evidence for the efficacy and the cost effectiveness of brief interventions in primary health care, such interventions are rarely integrated into routine clinical practice (Heather 1996), and clinical guidelines (US Department of Health and Human Services 1995) are poorly adhered to (Brotons *et al.* 1996; Spandorfer *et al.* 1999). Although a high proportion of general practitioners state that they screen and intervene for alcohol problems (Kaner *et al.* 1999a; McAvoy *et al.* 1999; Haley *et al.* 2000; McAvoy *et al.* 2000; Lopez-de-Munai *et al.* 2001), actual screening and intervention rates are low, (Gomel *et al.* 1998; Rumpf *et al.* 2001), and patients themselves report that they rarely get asked about alcohol, even in the case of excessive drinkers (Aalto *et al.* 2001).

General practitioners have reported that they find managing alcohol problems difficult (Anderson, Kaner, Wutzke *et al.*, submitted for publication; see part III). They are less active in obtaining information about alcohol from their patients, rate reducing alcohol consumption as less important for health, and rate themselves as less prepared and less effective in advising their patients to reduce alcohol intake than in other areas of clinical prevention, such as tobacco dependence, weight control and promoting physical activity (Saunders & Wutzke 1998). It is important, therefore to identify if it is possible to increase the engagement of general practitioners specifically in the management of alcohol problems and to identify which strategies are most likely to be effective.

With the notable exception of the World Health Organization collaborative study on the implementation of screening and brief intervention programmes in primary health care (Anderson 1996; Monteiro & Gomel 1998), there appears to have been a lack of well-designed research that examines the effectiveness of different strategies to enhance the engagement of general practitioners in managing alcohol problems (Richmond & Anderson 1994; Cheng & Anderson 1998; Roche 1996; Sandlow & Dos-Santos 1997). Available studies have suffered from both conceptual flaws (for example lack of theoretical foundations and failure to incorporate behavioural change models) and technical flaws (for example lack of control groups and appropriate and consistent outcome measures). Nevertheless, reviews have suggested that training, which is skills based and interactional and which provides opportunities for practice and feedback to the trainee generally reports superior results compared to more traditional, static forms of education and training (Roche 1996). Broad ranging, multi-faceted approaches, which also entail structural changes seem to be more effective than single issue training programs (Cheng & Anderson 1998). Similarly, there is some evidence to support the value of on-site support agents (for example, facilitators) to act as role models, coaches

and colleagues in shared care arrangements for dealing with more sensitive and non-traditional areas of care (Richmond & Anderson 1994; Rush *et al*. 1995).

To fill a gap in the evidence base, this chapter reports a systematic review of interventions to engage primary health care providers in the management of alcohol problems, using the methodology of the Cochrane Effective Practice and Organization of Care Group (EPOC) (Freemantle *et al*. 1995; Bero *et al*. 2002). Estimates of the effect sizes of the interventions will be made, predictors of effect studied, and, where they are available, cost and cost effectiveness of the interventions reported.

METHODS

Identification of studies and data extraction

The following computerized databases were searched: MEDLINE (from 1966-2001); EMBASE (from 1980-2001); Cinahl (from 1982-2001); Cochrane Drug and Alcohol Group specialised register; Cochrane Effective Practice and Organisation of Care Group specialised register; and the Cochrane Library. In addition, the following journals were hand reviewed: Addiction (formerly British Journal of Addiction), Drug and Alcohol Review, and Alcohol and Alcoholism all from 1990 to 2001. In addition, investigators of the WHO international collaborative project implementing brief interventions for hazardous and harmful alcohol consumption in primary health care (Monteiro & Gomel 1988) were contacted requesting information about unpublished reports and abstracts, prepublication work and recently published trials.

Three categories of search terms were used: intervention related terms as defined by EPOC (Bero *et al.* 2002); primary health care related terms as defined by the Cochrane Collaboration (Cochrane Collaboration in Primary Health Care 2002); and alcohol related terms as defined by the Cochrane Drugs and Alcohol Group (Ferri *et al.* 2002).

The following inclusion criteria were adopted:

1. General criteria

i. studies that addressed hazardous and harmful alcohol consumption but not alcohol dependence as defined by the World Health Organization (Babor *et al*. 1994) and the ICD 10 Classification of Mental and Behavioural Disorders (World Health Organization 1992);
ii. studies that were based in primary health care as defined by the Cochrane Collaboration (Cochrane Collaboration in Primary Health Care 2002) with the types of health care providers being health care professionals (including physicians, nurses and psychologists), working in primary health care (including general practice, family practice, health centres, and polyclinics, all of which provided first-contact health care);
iii. studies that included interventions that were exclusively focused on alcohol as well as alcohol related interventions that were a part of broader prevention or treatment activities;
iv. studies that covered the adult age range of patients 18 years and older;
v. studies that were published between the years 1966 and 2001; and

vi. studies in English and other languages that at least two reviewers could manage (Dutch and Spanish).

2. EPOC criteria

i. studies that fit the design criteria of the EPOC (Bero *et al.* 2002), randomised controlled trials (RCTs), controlled clinical trials (CCTs), controlled before and after studies (CBAs), and interrupted time series studies (ITSs); and
ii. studies that fit the methodological criteria of the EPOC (Bero *et al.* 2002) containing outcome measures that were objective measurements in the following domains: i) health professional performance including measurement of alcohol intake, screening, counselling, making a follow-up and referral; and ii) client outcomes, including numbers screened, numbers counselled, numbers referred, changes in alcohol consumption over time, numbers drinking within recommended alcohol consumption limits, and physiological measures i.e. reduction in serum gamma glutamyl transferase.

Three independent reviewers identified papers from the searches on the basis of titles and abstracts. Identified papers were obtained and reviewed for further agreement with the inclusion criteria. A data extraction form was developed and tested, based on the template of EPOC (2002). Interventions to engage primary health care providers were classified as professional, financial, organizational and regulatory as defined by the EPOC (Bero *et al.* 2002). Where cost and cost effectiveness data were available, these were extracted. Data were extracted by two independent reviewers, with differences resolved through discussion. The data was entered into a SPSS data file and checked for accuracy.

Calculation of Effect Sizes

An effect size (ES) was calculated for every outcome measure reported, calculating the logged odds ratio, standard error and inverse variance weights according to Lipsey and Wilson (2001). Weighted mean effect sizes were calculated with each effect size weighted by the inverse of its variance (Hedges & Olkin 1985) to account for the consideration that an effect size based on a large sample size is a more precise estimate of an intervention effect than an effect size based on a small sample size (Wilson 2000). In calculating the weighted mean effect size, a random effects model was used (Lipsey & Wilson 2001). For multiple programmes within one study, where there is statistical dependence between the programmes, weights were calculated according to Gleser and Olkin (1994). Ninety-five percent confidence intervals were calculated according to Hedges and Olkin (1985).

Independent variables

The independent variables, which were studied as predictors of effect included unit of analysis, which was coded as provider or patient; type of outcome, which was coded as related to screening or related to intervening; specificity of the programme, which was coded alcohol specific (a programme designed to change health care providers' behaviour specifically in relation to alcohol) or general (a programme which was designed to change health care providers' behaviour more generally in relation to prevention or treatment, but which included an alcohol-related outcome measure); type

of intervention, which was coded as professionally based or organizationally based as defined by the EPOC (2002); whether or not the programme was outreach, where the term outreach visit was used to describe a personal visit by a trained person to a health provider in his or her own setting, sometimes referred to as university-based educational detailing, public interest detailing, and academic detailing (Soumerai *et al*. 1989); and whether or not the programme was multi-faceted, which was defined as a programme that included more than one type of professional intervention or more than one type of organizational intervention or a combination of professional and organizational interventions as defined by the EPOC (2002).

Statistical tests

Z-tests were used to compare weighted mean effect sizes of the different values of the categorical independent variables. Analog to the ANOVA techniques were used to partition the total heterogeneity of the variability between effect sizes (Q_T) into the portion explained by the catogorial variable (Q_B) and the residual or remaining portion (Q_W). Weighted random effects least squares regression analysis was used to identify relationships between predictors in explaining effect sizes for categorical variables, recoded to dummy variables (Thompson 2001). Each un-weighted programme effect size (the dependent variable) was corrected by its weight. The standard errors of the regression coefficients (B) were corrected and used in a z-test (Hedges & Olkin 1985).

RESULTS

Trial flow

The literature searches identified 468 titles. Screening on the basis of titles and abstracts reduced the number of publications to 41. Of these, twelve fit the inclusion criteria and 29 did not. Of the 29, seven did not fit the general inclusion criteria, 18 did not fit the EPOC study design criteria and four, which fit the EPOC study design criteria, did not fit the EPOC methodological inclusion criteria (Table 8A.1). In those studies where the efficacy of more than one experimental condition was compared to a control condition (e.g., training and training plus ongoing support versus a control group), the different experimental conditions were treated as separate programmes.

A funnel graph plotting effect size versus the inverse of the standard error of the effect size estimate (Begg 1994; Egger *et al.* 2001; Sterne *et al.* 2001) indicated that there might have been a slight lack of studies with small sample sizes showing no significant effects (Figure 8.1).

Description of studies

Of the twelve trials that met the inclusion criteria, nine contained one programme, and three contained two programmes, resulting in 15 programmes, all of which were randomized at the level of the provider. All of the providers were accredited general practitioners or family practice physicians, with the exception of the study by Rodney *et al*. (1985), in which the providers were family medicine residents (Table 8.1). All 15 programmes measured outcomes of providers' behaviour. For eight

programmes from six trials, the unit of analysis was at the level of the provider, and for nine programmes from seven trials, the unit of analysis was at the level of the patient. Two programmes from one trial (Kaner *et al*. 1999b) provided outcome data at both the level of the patient and the level of the provider. In five programmes from four trials, the comparison group was a control or normal care group. In ten programmes from eight trials, the comparison group was a less intensive intervention.

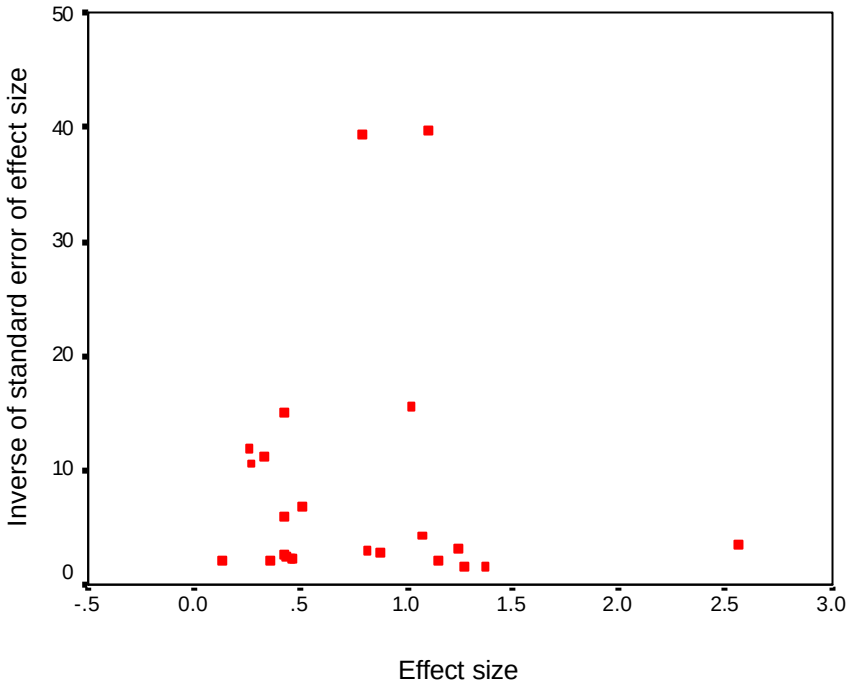

Figure 8.1 Funnel plot of effect sizes by inverse of standard error of effect size

Of the seven trials that included outcomes at the patient level, but with randomization at the provider level, only two (Adams *et al*. 1998; Bonevski *et al*. 1999) used appropriate multilevel statistics. Thirteen programmes from eleven trials provided outcomes that were related to screening activity and ten programmes from seven trials provided outcomes that were related to intervention activity, resulting in 23 outcomes. Seven programmes from five trials provided outcomes that were related to both screening and intervention activity (Kaner *et al*. 1999b; Gomel *et al*. 1998; Gual *et al*. unpublished; Pas *et al*. unpublished; McCormick *et al*. unpublished).

Eighteen outcomes were from programmes that were alcohol specific and five were from programmes in which alcohol was included as part of broader clinical prevention. Fourteen outcomes were from programmes that were single faceted and nine from programmes that were multi-faceted. Thirteen outcomes were from outreach programmes and ten outcomes from non-outreach programmes. Eighteen outcomes were from professionally based interventions and five outcomes were from organizational based interventions.

Table 8.1 Description of 15 programmes [1]

Study	Intervention	Outcome measure	Sample size [2]	Effect size [3] (95% CI)
Unit of analysis measuring provider performance at level of provider				
Kaner *et al.* 1999b[4] England Alcohol specific	One single-faceted educational outreach visit	Screened at least one patient within 12 week implementation period	C=43 I=43	0.47 (-0.38-1.32)
	One multifaceted educational outreach visit and six educational telephone contacts	Screened at least one patient within 12 week implementation period	C=43 I=42	1.15 (0.25-1.05)
Lock *et al.* 2000a[4] England Alcohol specific	Single faceted telemarketing of intervention programme	Screened at least one patient within 12 week implementation period	C=320 I=213	0.82 (0.17-1.46)
	Single faceted outreach personal marketing of intervention programme	Screened at least one patient within 12 week implementation period	C=320 I=196	1.25 (0.63-1.86)
Lockyer 1996 Canada Alcohol specific	Single faceted one day training workshop with 3 3 hour booster sessions	Performance on standardized patient interviews; average of process and content measures	C=28 I=26	0.42 (-0.33-1.17)
Gual *et al.* Unpublished[4,5] Alcohol specific	One multifaceted educational outreach visit and six educational telephone contacts	Screened at least 20% of eligible patients within 12 week implementation period	C=22 I=38	1.37 (0.12-2.61)
		Counselled at least 10% of at risk patients within 12 week implementation period	C=22 I=38	1.27 (0.07-2.47)
Pas *et al.* Unpublished[4,5] Alcohol specific	One multifaceted educational outreach visit and six educational telephone contacts	Screened at least 20% of eligible patients within 12 week implementation period	C=60 I=69	0.46 (-0.39-1.31)
		Counselled at least 10% of at risk patients within 12 week implementation period	C=60 I=69	0.43 (-0.35-1.21)

McCormick *et al.* Unpublished[4,5] Alcohol specific	Single faceted six educational telephone contacts	Screened at least 20% of eligible patients within 12 week implementation period	C=39 I=37	0.13 (-0.79-1.35)
		Counselled at least 10% of at risk patients within 12 week implementation period	C=39 I=37	0.36 (-0.57-1.28)
Unit of analysis measuring provider performance at level of patient				
Adams *et al.* 1998 United States Alcohol specific	Multifaceted educational meetings and office support patient mediated interventions	Received average of 15 counselling steps by physician measured at patient exit interview	C=145 I=201	2.56 (1.99-3.13)
Bonevski *et al.* 1999 Australia General	Single-faceted patient mediated intervention; audit and feedback; reminders	Classified by physician in medical records as hazardous or harmful user of alcohol	C=750 I=675	0.51 (0.22-0.80)
Borgiel *et al.* 1999 Canada General	Single faceted education workshop with opinion leaders	Asked by physician about alcohol during year following intervention	C=1254 I=1141	0.26 (0.10-0.43)
Gomel *et al.* 1998[4] Australia Alcohol specific	One single faceted educational outreach visit	Number of eligible patients screened	C=18427 I=26248	0.79 (0.74-0.84)
		Number of at risk patients advised by GP during 12 week implementation period	C=3807 I=6066	0.42 (0.29-0.55)
	One multifaceted educational outreach visit and 3 educational telephone contacts	Number of eligible patients screened	C=18427 I=24926	1.10 (1.05-1.15)
		Number of at risk patients advised by GP during 12 week implementation period	C=3807 I=6231	1.02 (0.89-1.15)
Kaner *et al.* 1999b[4] England Alcohol specific	One single-educational outreach visit	Number of at risk patients advised by GP during 12 week implementation period	C=750 I=1127	0.27 (0.09-0.46)
	One multifaceted educational outreach visit and six educational telephone contacts	Number of at risk patients advised by GP during 12 week implementation period	C=750 I=1654	0.33 (0.16-0.51)

Rodney *et al.* 1985 United States General	Single faceted organizational change in design of medical records pre-printed with blank space to record alcohol consumption	Records completed by physician during year following change	C=189 I=201	0.88 (0.19-1.57)
Wilson *et al.* 1992 United Kingdom General	Single faceted organizational provider oriented intervention; increase in length of consultation	Proportion of patients' notes with recording of alcohol consumption	C=2910 I=1411	1.08 (0.63-1.53)
Wilson *et al.* 1992 United Kingdom General	Single faceted organizational provider oriented intervention; increase in length of consultation	Proportion of patients advised about alcohol consumption	C=1884 I=956	0.42 (0.09-0.75)

[1]All the studies were randomized controlled trials, with the exception of Wilson *et al.* (1992), which was a controlled clinical trial

[2]C, number in control group: I, number in intervention group

[3]All the estimators of effect size were logged odds ratios; proportions were estimated from the data of Lockyer (1996); numbers given are ES with 95% confidence intervals

[4]Part of the World Health Organization Phase III study of the dissemination and implementation of screening and brief intervention programmes in primary health care (Anderson 1996; Monteiro & Gomel 1998)

[5]Data abstracted from analysis undertaken in Anderson, Kaner, Gomel *et al.* (submitted for publication); see chapter 9.

Effects size estimates

The weighted mean effect size (WES) was 0.73 (95%CI, 0.56-0.90) with a heterogeneous variation (Q=329.6; df=22, p<0.001). The intervention groups resulted in screening and counselling rates of 45% (95%CI, 33%-56%), whereas the comparison groups resulted in rates of 32% (95%CI, 20%-43%), a difference of 13% (95%CI, 8%-18%). There was no difference in effect sizes between the programmes with a control or normal care comparison group (WES=1.07; 95%CI, 0.33-1.82) and the programmes with a less intensive intervention comparison group (WES=0.65; 95%CI, 0.46-0.83) (Q_B=0.41, df=1, p, ns). As there was no difference between the two weighted mean effect sizes by levels of analysis of provider (WES=0.73; 95%CI, 0.48-0.98) or patient (WES=0.74; 95%CI, 0.53-0.94) (Q_B=1.04, df=1, p,ns), subsequent analyses combined outcomes at the provider and patient levels.

Predictors of effect - explaining the heterogeneity

Comparisons of weighted mean effect sizes with Z-tests found multi-faceted programmes to be more effective than single faceted programmes (Table 8.2). No other comparisons of weighted mean effect sizes were significant with Z-tests.

Table 8.2 Predictors of effect based on 23 outcomes.

Predictor and z-test	Category	Weighted effect size (95% CI)
Type of outcome z-test, ns	Related to screening	N=13 0.77 (0.56-0.97)
	Related to intervention	N=10 0.71 (0.40-1.01)
Whether or not part of WHO study z-test, ns	Part of WHO study	N=16 0.70 (0.51-0.89)
	Not part of WHO study	N=7 0.85 (0.39-1.30)
Alcohol specific or general prevention z-test, ns	Alcohol specific	N=18 0.78 (0.59-0.97)
	General prevention	N=5 0.55 (0.29-0.80)
Multi- or single faceted z-test*	Multifaceted	N=9 1.03 (0.72-1.34)
	Single faceted	N=14 0.56 (0.38-0.75)
Type of intervention z-test, ns	Professionally based	N=18 0.65 (0.46-0.83)
	Organizationally based	N=5 1.06 (0.43-1.70)
Outreach or not z-test, ns	Outreach	N=13 0.72 (0.52-0.92)
	Non-outreach	N=10 0.75 (0.38-1.13)

P value: *p<0.05; **p<0.01;***p<0.001.

A weighted least squares regression analysis with entry of the independent variables specificity of programme (alcohol or general), whether or not outreach, whether or not multifaceted and type of intervention (professional or organizational) on the dependent variable effect size, controlling for unit of analysis, whether or not WHO study and type of outcome (screening or intervening) found a significant effect for alcohol specific, multi-faceted programmes, explaining 73% of the variation in weighted effect size (Table 8.3).

Table 8.3 Weighted least squares regression analysis

Independent variables	ß	B	Std. Error	Z score
Multifaceted	0.59	0.33	0.040	8.77***
Alcohol specific	0.52	0.61	0.084	7.21***

Weighted random effects model with entry of variables, including specificity of programme (alcohol or general), whether or not outreach, whether or not multifaceted and type of intervention (professional or organizational), controlling for unit of analysis, whether or not WHO study and type of outcome (screening or intervening). ? = standardized regression coefficient; B = Unstandardized coefficient; Std. Error = corrected standard error of B (Hedges & Olkin 1985, p. 174); Z score = corrected statistical significance of the regression coefficient (Hedges & Olkin 1985, p.174); p value: *p<0.05; **p<0.01;***p<0.001. Adjusted $R^{2=}$0.73.

Costs and cost effectiveness

Three of the studies provided costs and cost effectiveness data, Table 8.4. At the provider level, the cost of implementation increased with the increasing level of support. At the patient level, the cost per patient advised slightly increased with increasing level of support in the Australian study (Gomel *et al*. 1998), but decreased in the English study (Kaner *et al*. 1999b). Wutzke *et al*. (2001) calculated the cost effectiveness of the Australian data and estimated that there was little difference in the costs per year of life saved between the control and the minimal and maximal support groups.

DISCUSSION

Although caution should be used in the interpretation of the results, because of the small number of programmes, the interventions reviewed had an impact in engaging general practitioners in the management of alcohol problems, with the intervention leading to an absolute increase in providers' behaviour of between 8% and 18% over the comparison group. Programmes that were alcohol specific and that were multifaceted seemed to be the most promising. No differences were found between professional as opposed to organizational based interventions. For those studies that provided cost and cost effectiveness data, at the provider level the cost of implementation increased with the increasing level of support, whereas at the patient level the cost per patient was similar with increasing levels of support.

The findings are consistent with those of a similar review of 24 programmes testing the effectiveness of different strategies to engage general practitioners in providing smoking cessation advice and treatment (Jané-Llopis & Anderson; submitted for publication), which found absolute increases in providers' screening and counselling behaviour of between 10% and 20% over the comparison group. For smoking cessation, greater effects were found for outreach as opposed to non-outreach programmes, for multifaceted as opposed to single faceted programmes and for programmes that combined professional and organizational interventions as opposed to either alone.

Table 8.4 Cost and cost-effectiveness data

Outcome at provider level			
		Cost per GP giving at least one intervention	
Kaner *et al.* 1999b	Materials and instructions only	£74.29	
	One educational outreach visit	£92.80	
	One educational outreach visit and six telephone support contacts	£128.92	
Lock *et al.* 2000a	Postal marketing	£28.33	
	Telemarketing	£27.85	
	Personal marketing	£127.90	
Outcome at patient level			
		Cost per patient advised	Cost per life year saved[1]
Gomel *et al.* 1998	Materials and instructions only	Aus$3.51	Aus$645
	One educational outreach visit	Aus$2.16	Aus$581
	One educational outreach visit and six telephone support contacts	Aus$4.33	Aus$653
Kaner *et al.* 1999b	Materials and instructions only	£8.19	
	One educational outreach visit	£6.02	
	One educational outreach visit and six telephone support contacts	£5.43	

[1] Data from Wutzke *et al.* (2001).

The changes found in the present review are also similar to those of other studies that have attempted to change health care providers' behaviour. In a review of outreach visits, which consisted of several components, including written materials and conferences, and in which the targeted behaviours were mostly prescribing practices, there were positive effects in favour of the intervention group in 12 of 13 trials of combined interventions of between 15% and 68% (Thomson O'Brien *et al.* 2002), particularly for those outreach visits that combined a social marketing approach. In the three trials in which outreach visits alone were compared to a no intervention control group, the relative improvement ranged from 24% to 50%. In their review of interventions to improve the delivery of clinical preventive services in primary care Hulscher *et al.* (2002) found that five comparisons of group education versus no intervention showed absolute changes of preventive services varying between -4% and +31%, and fourteen comparisons of multifaceted interventions versus no intervention showed absolute changes of preventive services varying between -3% and +64%.

Out of a total of 464 titles identified by the literature searches there were only a potential of 41 papers. Of the 34 papers that were judged against the EPOC inclusion criteria, only 12 were found to be of sufficient methodological quality. Eighteen did not meet the criteria of study design and four, which fulfilled the criteria of study design, did not meet the criteria of methodological inclusion, primarily by failing to provide objective outcome measurements. This meant the exclusion of some 'well-known' effective studies (e.g. Ockene *et al*. 1997; Richmond *et al*. 1998).

The funnel graph plot indicated that there might have been a slight lack of studies with small sample sizes showing no significant effects (Begg 1994). If this were the case, the overall treatment effect might be slightly over-estimated. On the other hand, there is some evidence that including lower quality studies in a meta-analysis increases the overall effect size, because in general lower quality studies report higher effect sizes (Moher *et al*. 1999). Thus, using the rigorous criteria of the EPOC so that only controlled and randomised trials which reported sufficient information to calculate an effect size were included may have decreased the overall effect size.

For those programmes in which the unit of allocation is at the level of the provider and the unit of analysis at the level of the patient, multilevel statistical analysis should be used because the patients are grouped within general practices and patients within one general practice are expected to be more alike than patients in different general practices. Ignoring this grouping in the analysis is likely to provide an overestimate of the error variance and thus possible erroneous conclusions (Healy 2001). Only two out of seven trials that should have done so used appropriate multilevel statistics.

CONCLUDING REMARKS

Although there is a pressing need for more implementation research it does seem possible to increase the engagement of primary health care providers in the management of alcohol problems. Promising programmes seem to be those that are alcohol specific and multifaceted. A similar review of the effectiveness of different strategies to engage general practitioners in providing smoking cessation advice suggested that programmes also need to be targeted, with professional interventions more effective in changing patient outcomes and organizational interventions more effective in changing screening rates (Jané-Llopis & Anderson, submitted for publication). Additional studies will be needed of the engagement of primary health care providers in managing alcohol problems to determine the relative impact of outreach as opposed to non-outreach programmes and the relative impact of professional and organizational based interventions, and why some interventions work and others do not. None of the studies included in the meta-analysis studied changes in patients behaviour, and it is important determine if the changes in provider behaviour follow through to changes in patient behaviour. How the impact of interventions to engage primary health care providers might be improved and the interaction between the general practitioners' attitudes towards working with drinkers and professionally based interventions will be the subject of chapter 9.

Table 8A.1 Reasons for excluding 29 trials

Studies that do not fit inclusion criteria other than EPOC criteria	
Buchsbaum *et al.* (1993) A program of screening and prompting improves short-term physician counselling of dependent and nondependent harmful drinkers.	Target group medical students
Goldberg *et al.* (1990) Alcohol counselling in a general medical clinic: A randomized controlled trial of strategies to improve referral and show rates.	Conducted in general medical clinic, not primary health care clinic
Johns *et al.* (1992) Promoting prevention services in primary care: a controlled trial.	No alcohol data provided
Lustig *et al.* (2001) Improving the delivery of adolescent clinical preventive services through skills-based training.	Addresses adolescents, not adults
Roche *et al.* (1997). A controlled trial of educational strategies to teach medical students brief intervention skills for alcohol problems.	Target group medical students
Szczepura *et al.* (1994) Effectiveness and cost of different strategies for information feedback in general practice.	No alcohol data provided
Walsh *et al.* (1999) Teaching medical students alcohol intervention skills: results of a controlled trial.	Target group medical students
Studies that do not fit EPOC study design criteria	
Andreasson *et al.* (2000). Implementation and dissemination of methods for prevention of alcohol problems in primary health care: a feasibility study.	Descriptive study
Bernstein & Levenson (1997). Project ASSERT: an ED-based intervention to increase access to primary care, preventive services, and the substance abuse treatment system.	Descriptive study
Brown (1988) Evaluation of a continuing medical education program for primary care physicians on the management of alcoholism.	Descriptive study
Conigliaro *et al.* (1988) Screening for problem drinking: impact on physician behaviour and patient drinking habits.	Descriptive study
Digiusto *et al.* (1998) Effectiveness of CME workshops for alcohol and other drug-related interventions in general practice.	Descriptive study
Garcia *et al.* (1999) Continuous quality improvement in primary health care: A five year project.	Descriptive study
Lawner *et al.* (1997) Implementation of CAGE alcohol screening in a primary care practice.	Descriptive study
Maitland *et al.* (1991) Two stage audit of cerebrovascular and coronary heart disease risk factor recording: the effect of case finding and screening programmes.	Descriptive study

Mason (1997) Alcohol counsellors in general practice (part 1).	Practices not randomly selected
McMenamin (1995) Screening for coronary heart disease risk among men in a general practice.	Descriptive study
Ockene et al. (1997) Provider training for patient centred alcohol counselling in a primary care setting.	Before and after study with no control group
Prislin *et al.* (1997) Family practice residency behavioural science training: influence on graduate practice activity.	Descriptive study
Richart-Rufino *et al.* (1993) Implantacion de un programa de actividades preventivas en un centro de salud. [The introduction of a program of preventive activities at a health centre].	Descriptive study
Richmond *et al.* (1998) Effect of training on general practitioners' use of a brief intervention for excessive drinkers.	General practitioners self-selected into intervention or control groups
Siegal *et al.* (2000) Can a brief clinical practicum influence physicians' communications with patients about alcohol and drug problems? Results of a long-term follow-up.	Descriptive study
Talashek *et al.* (1995) Family nurse practitioner clinical competencies in alcohol and substance use.	Before and after study with no control group
Taverner *et al.* (2000) Comparison of methods for teaching clinical skills in assessing and managing drug-seeking patients.	Descriptive study
Vinson *et al.* (2000) Alcohol-related discussions in primary care: a report from ASPN. Ambulatory Sentinel Practice Network.	Before and after study with no control group
Fits EPOC study design criteria, but not methodological inclusion criteria	
Hansen *et al.* (1999) Encouraging GPs to undertake screening and a brief intervention in order to reduce problem drinking: a randomized controlled trial.	No objective outcome measures (self-report by GP)
McCormick *et al.* (1999) Encouraging general practitioners to take up a screening and early intervention for problem use of alcohol: a marketing trial.	No objective outcome measures (self-report by GP)
McCormick *et al.* (2001) Does follow-up telephone support encourage general practitioners to continue using an alcohol screening and brief intervention programme?	No numerical data provided to calculate an effect size
Roche & Richard (1994) Early intervention for alcohol problems in general practice: an evaluation of a simple dissemination strategy.	No objective outcome measures

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CHAPTER 9

ATTITUDES AND MANAGING ALCOHOL PROBLEMS IN GENERAL PRACTICE: AN INTERACTION ANALYSIS[1]

ABSTRACT

Aims To determine if general practitioners' attitudes towards working with drinkers moderated the impact of training and support on screening and brief intervention activity in routine practice. To determine also if the provision of training and support and engagement in screening and brief intervention led to improved attitudes to the management of alcohol problems over time.

Methods Subjects were 340 general practitioners from four countries who were part of a World Health Organization randomized controlled trial to evaluate the effectiveness of outreach training and ongoing support in increasing screening and brief alcohol intervention. General practitioners' self-reported attitudes towards working with drinkers (role security and therapeutic commitment) were measured with the shortened alcohol and alcohol problems perception questionnaire. Attitude measurement occurred at baseline (before trial interventions) and three months after the end of the twelve week intervention period (six months after baseline).

Findings Whereas training and support increased general practitioners' screening and brief intervention rates, it only did so for practitioners with initially high role security and therapeutic commitment. The provision of support did not improve attitudes towards working with drinkers, and for those who were already insecure in their role and therapeutically uncommitted made it worse. Engagement in screening and brief intervention activity did not improve subsequent attitudes. For practitioners who were already insecure in their role, experience in brief interventions made their role security worse.

Conclusions To enhance the involvement of general practitioners in the management of alcohol problems, interventions that increase both actual experience and address practitioners' attitudes is required. Such support could take the form of on site support agents and facilitators.

INTRODUCTION

Primary care health providers have been charged with the responsibility of identifying and intervening with patients whose drinking is hazardous or harmful to their health (Babor & Higgins-Biddle 2001). Screening and brief intervention for alcohol consumption among patients in primary health care provides an opportunity to educate patients about the risks of hazardous and harmful alcohol use. Information about the amount and frequency of alcohol consumption may inform the diagnosis of the patient's presenting condition, and it may alert clinicians to the need to advise

[1] Based on: Anderson, P., Kaner, E., Wutzke, S., Funk, M., Heather, N., Wensing, M., Grol, R., Gual, A. & Pas, L. Attitudes and managing alcohol problems in general practice: an interaction analysis based on Findings from a WHO Collaborative Study (submitted for publication).

patients whose alcohol consumption might adversely affect their use of medications and other aspects of their treatment. Of utmost importance for screening and brief intervention programmes is the fact that people who are not dependent on alcohol may reduce or stop their alcohol consumption with appropriate assistance and effort. Once dependence has developed, reducing or stopping alcohol consumption is more difficult and often requires specialized treatment.

However, many primary care health workers are reluctant to screen and advise patients in relation to alcohol use. Among the reasons most often cited are lack of time, inadequate training, fear of antagonizing patients, the perceived incompatibility of alcohol brief intervention with primary health care, and the belief that those who are dependent on alcohol do not respond to interventions (Roche & Richard 1991; Roche *et al*. 1991; Roche *et al*. 1996; Richmond & Mendelsohn 1996; McAvoy *et al*. 1999; Kaner *et al*. 1999a; Cornuz *et al*. 2000; Aalto *et al*. 2001; Kaariainen *et al*. 2001).

A meta-analysis of interventions to engage general practitioners in the management of alcohol problems found significant increased effects for the intervention group compared with the control group of between 8% and 18% (Anderson, Laurant *et al*. submitted for publication, see Chapter 8). Since general practitioners who report that they manage more patients with alcohol problems express increased role security and therapeutic commitment in this role (as measured by the short alcohol and alcohol problems perception questionnaire, Anderson & Clement 1987; see Chapter 6) (Anderson, Kaner *et al*.; submitted for publication, see Chapter 7), it is important to investigate the extent to which these attitudes moderate the relationship of support and training on screening and brief alcohol intervention. Acting as moderators, role security and therapeutic commitment could affect both the strength and the direction of the relationships between support and training and screening and brief intervention rates (Baron *et al*. 1986). It has also been proposed that providing support and training and the experience of screening and brief intervention would in turn lead to strengthened role security and increased therapeutic commitment (Shaw *et al*. 1978).

This paper reports on additional analysis of data from a World Health Organization collaborative randomized controlled trial which demonstrated the effectiveness of training and support in promoting screening and brief intervention for hazardous and harmful alcohol consumption (Gomel *et al* 1998; Kaner *et al*. 1999b; Funk *et al*; submitted for publication). Two questions are asked: 1) do existing role security and therapeutic commitment moderate the relationship that support has on increased screening and brief intervention; 2) do the provision of support and undertaking screening and brief intervention lead to strengthened role security and therapeutic commitment over time, and, if so, are the relationships moderated by existing role security and therapeutic commitment.

METHODS

Data from Australia, Belgium, Catalonia, and England that compared the impact of a high training and support group with a control group, and that provided measurements of role security and therapeutic commitment of general practitioners were utilized.

The screening and brief intervention programme

The screening and brief intervention programme, 'Drink-less' (Gomel *et al.* 1994), based on a package of proven efficacy (Babor *et al*. 1992) was translated and adapted for each participating country. Physicians and receptionists were asked to screen all eligible patients (patients aged 16 years of age and over who were not repeat attendees, who were well enough to complete the questionnaire, and who understood the native language of the country) using the World Health Organization's AUDIT Questionnaire (Saunders & Aasland 1987; Babor *et al.* 2001) or a modification of this (Degenhardt *et al*. 2001). The study design required receptionists to hand out the screening questionnaires while patients waited to see the physician and then placed a sticker on the patient's file to prevent repeat screening. Receptionists or physicians kept a tally of the number of patients who were not screened.

During the consultation the physicians scored the screening questionnaires with a provided template to identify at risk patients. Brief advice, of up to five minutes, was provided to at risk patients using an advice card designed specifically for the study. Patients were given a self-help booklet that reinforced the advice. Carbon copies of completed screening questionnaires were collected to calculate the numbers of hazardous drinkers. The questionnaires included a section for the physician to record whether a patient had been advised and/or given a self-help booklet. At the end of the twelve week intervention period unused program materials were counted to verify the screening and brief intervention rates (see below), blind to which support group the general practitioner was allocated.

General practitioners and their allocation to the support and control groups

The general practitioners were random samples selected from databases of practitioners maintained by national or regional health authorities or by academies and associations of general practitioners who had requested and agreed to use a screening and brief alcohol intervention program in an earlier trial (Funk et al, submitted for publication). This trial evaluated the effectiveness of three different marketing conditions (direct-mail, tele-marketing and academic detailing) in promoting the dissemination of the program. Practitioners were randomly allocated to the training and support or control groups, stratified, where possible, by previous marketing condition and blind to the knowledge of the individual practitioner. Only one general practitioner per practice was selected.

In the high training and support group, both physicians and receptionists received initial training in the implementation of the program. They were provided with ongoing support and advice regarding program implementation issues via alternate fortnightly telephone calls and visits throughout the twelve week study period. In the control group, the package, containing written guidelines for implementation and the collection of research data, was either dropped-off or mailed to each practice without demonstration or ongoing training or support.

Screening and brief intervention rates

Screening and brief intervention rates were calculated blind as to which support group the general practitioner was allocated. The screening rate was calculated for each general practitioner as the number of patients screened during the twelve week intervention period divided by the number of patients eligible for screening times 100. Where data were not available to calculate a screening rate, the rate was set at zero. Where the calculated rate was higher than 100, it was set at 100. The brief intervention rate for each general practitioner was calculated as the number of patients advised or given a self-help booklet during the twelve week intervention period divided by the total number of hazardous drinkers times 100. The number of hazardous drinkers was identified independently by researchers from the results of the AUDIT questionnaire. Where data were not available to calculate a brief intervention rate, the rate was set at zero. Where the calculated rate was higher than 100, it was set at 100.

Both screening and brief intervention rates were highly skewed, with large proportions of general practitioners scoring zeros. The median value of the screening rate was 7.5% and of the brief intervention rate 2.8%. The sample was dichotomized into those with low activity (less than 20% for screening and less than 10% for brief intervention) and those with high activity (20% or more for screening and 10% or more for brief intervention). A screening rate of 20% means for each individual general practitioner that 20% of eligible patients were screened and a brief intervention rate of 10% means for each individual general practitioner that 10% of at risk patients were advised or given a self-help booklet. Approximately two thirds of the general practitioners were in the low activity groups and one third in the high activity groups.

Role security and therapeutic commitment

Role security and therapeutic commitment were measured by responses to the short form of the Alcohol and Alcohol Problems Perception Questionnaire (Anderson & Clement 1987), which were summed within the two scales of role security and therapeutic commitment. Role security measures role adequacy, for example "*I feel I can appropriately advise my patients about drinking and its effects";* and role legitimacy, for example, "*I feel I have the right to ask patients questions about their drinking when* necessary". Role insecurity is expressed at the emotional level as therapeutic commitment which measures motivation, for example "*pessimism is the most realistic attitude to take toward drinkers"*; task specific self-esteem, for example "*all in all I am inclined to feel I am a failure with drinkers"*; and work satisfaction, for example *"in general, it is rewarding to work with drinkers"*. Individual missing values for any of the items of the domains were assigned the mean value of the remaining items of the domains before being summed. General practitioners were dichotomized by the median value at baseline into those with higher or lower role security (the top 3 items of the seven-point scale, representing positive views versus the bottom 4 items representing negative views) and higher or lower therapeutic commitment (the top 4 items of the seven-point scale, representing positive views versus the bottom 3 items representing negative views).

General practitioners were also dichotomized into those with higher or lower role security and higher or lower therapeutic commitment by the median value at six

months follow-up, and into those with increased role security and therapeutic commitment between baseline and six months follow-up and those with not.

Analysis

The whole dataset was combined and analyzed at the level of the individual general practitioner. Multilevel logistic regression analyses were used to calculate odds ratios (OR) with 95% confidence intervals, with country as a nesting random factor, using SASv6.12, macro:glimmix. The regression analyses controlled for the gender and the age of the general practitioner. Interactions were tested and sub-group analyses performed to study the moderating impacts of baseline role security and therapeutic commitment.

RESULTS

The distribution of the variables by country is shown in Table 9.1.

Table 9.1 Variables by country.

Country/ region	GPs (n)	In training and support group (%)	Scoring high on screening rates (%)		Scoring high on brief intervention rates (%)		Scoring in top half of possible score for role security (%)	Scoring in top half of possible score for therapeutic commitment (%)
			Control group	Training & support group	Control group	Training & support group		
Australia	76	55.3	32.4	59.5	26.5	61.9	85.5	19.7
Belgium	129	46.5	17.4	25.0	16.3	40.5	50.5	11.4
Catalonia	50	56.0	22.7	53.6	23.2	31.7	74.0	16.0
England	85	49.4	16.3	28.6	27.3	57.1	81.8	21.8
Total	340	50.6	20.8	39.0	22.6	45.3	69.9	16.4

Approximately one fifth of the general practitioners in the control group scored high on screening and brief intervention rates, whereas approximately two fifths of the general practitioners in the training and support group scored high on screening and brief intervention rates. Whilst over two thirds (69.9%) of the total sample of general practitioners felt role secure, less than one fifth (16.4%) felt therapeutically committed. Calculations of the intra-class correlations estimated that 13.7% of the variance in screening rates, 22.2% of the variance in brief intervention rates and 12.3% of variance in expressed role security and therapeutic commitment were explained by the country or region of the general practitioner.

Of the 277 out of 340 general practitioners (81.5%) who completed the measure of role security and therapeutic commitment at baseline, 149 (54%) completed the scales three months after the end of the intervention period (six months following the baseline measurement). A higher proportion of general practitioners with higher role security (67%) completed the six month follow-up questionnaire than general practitioners with lower role security (42%) (χ^2=15.7, p<0.001). The difference between those with higher therapeutic commitment (60%) and lower therapeutic commitment (52%) was not significant (χ^2=1.64, p=0.124). Whereas the difference in the proportion of general practitioners who completed the six month follow-up questionnaire between the training and support group (60%) and the control group (52%) was not significant, (χ^2=2.01, p=0.098), a higher proportion of general practitioners in the high screening (76%) and high brief intervention (70%) groups completed the six month follow-up questionnaire than general practitioners in the low screening (46%) (χ^2=20.64, p<0.001) and low brief intervention (48%) (χ^2=12.0, p<0.001) groups.

Do existing role security and therapeutic commitment affect the relationship that training and support has on screening and brief intervention rates?

Whereas training and support led to increased screening and brief intervention rates (Table 9.2), baseline role security and therapeutic commitment did not.

Table 9.2 Odds ratios (95%CI) for high screening and high brief intervention rates*.

	Screening rates	**Brief intervention rates**
	N=277	N=277
Training and support	2.2 (1.3-3.1)	2.8 (1.6-4.0)
Baseline role security	1.4 (0.8-2.0)	1.5 (0.9-2.1)
Baseline therapeutic commitment	0.9 (0.5-1.3)	0.7 (0.4-1.1)

* Separate multilevel logistic regression analyses for each independent variable on its own with country as random nesting factor, controlling for the age and the gender of the general practitioner.

Baseline role security and therapeutic commitment affected the relationship that training and support had on screening and brief intervention rates. Training and support was only effective in leading to increased screening and brief intervention in the presence of high baseline role security and high baseline therapeutic commitment; with low baseline role security and low baseline therapeutic commitment, training and support was ineffective (Figure 9.1).

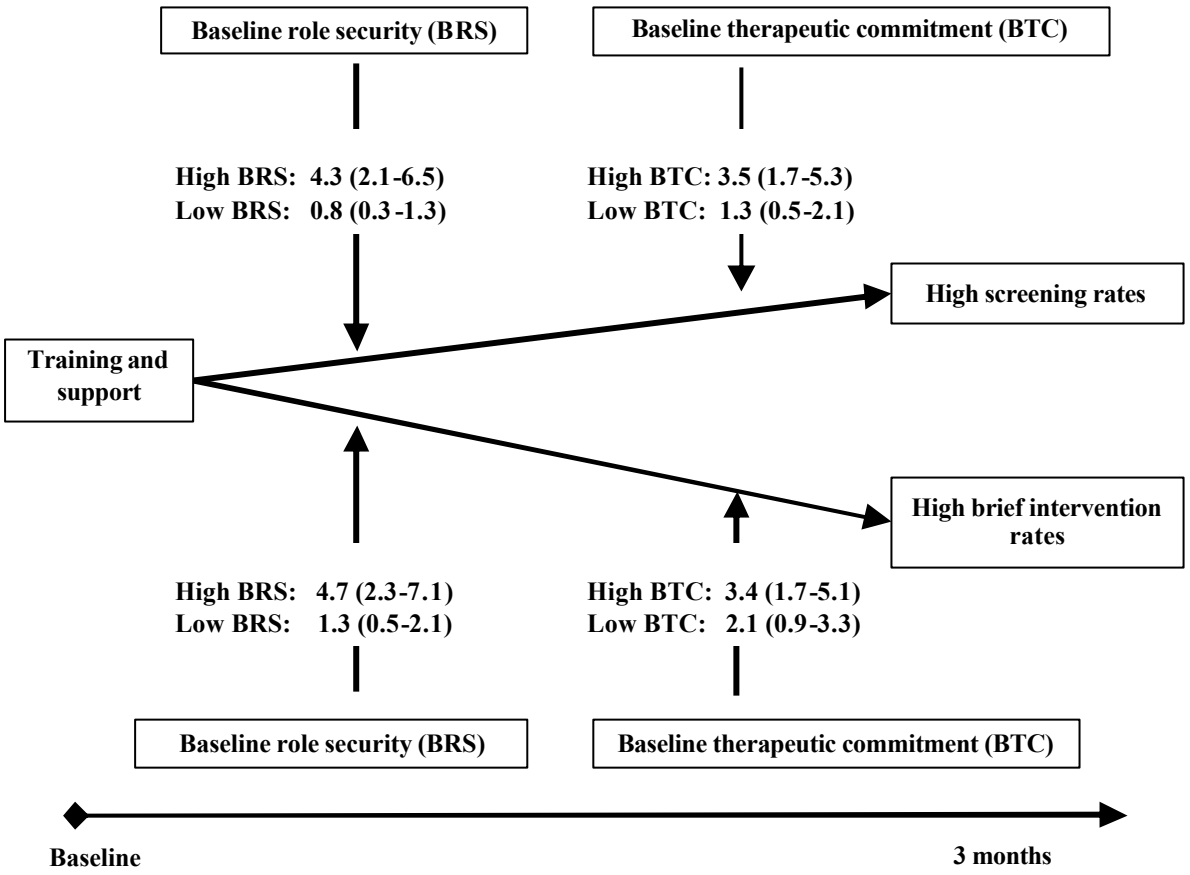

Figure 9.1 Odds ratios (95%CI)* for the impact of training and support on screening and brief intervention rates in the presence of high and low baseline role security (BRS) and high and low therapeutic commitment (BTC).
* Separate multilevel logistic regression analyses for each independent variable on its own with country as random nesting factor, controlling for the age and the gender of the general practitioner.

Do training and support and undertaking screening and brief intervention lead to increased role security and therapeutic commitment over time?

For the total sample of general practitioners, role security and therapeutic commitment decreased over time. For general practitioners with high role security and therapeutic commitment at baseline, the odds ratios for having high role security at six month follow-up was 0.6 (95%CI, 0.25-0.95) and for therapeutic commitment was 0.6 (95%CI, 0.3-0.9). Neither training and support nor high screening and brief intervention rates were associated with increased role security and therapeutic commitment at six months follow-up (Table 9.3).

Table 9.3 Odds ratios (95%CI) for having increased role security and increased therapeutic commitment at 6 months follow-up*.

	Increased role security at 6 month follow-up	**Increased therapeutic commitment at 6 month follow-up**
	N=149	N=149
Training and support	1.1 (0.5-1.7)	0.8 (0.4-1.2)
High screening rates	1.2 (0.5-1.9)	1.5 (0.7-2.3)
High brief intervention rates	1.0 (0.5-1.5)	1.0 (0.5-1.5)

* Separate multilevel logistic regression analyses for each independent variable on its own with country as random nesting factor, controlling for the age and the gender of the general practitioner.

The baseline level of role security and therapeutic commitment affected the relationships that training and support and high screening and brief intervention rates had on increased role security and therapeutic commitment at six months follow-up (Figure 9.2).

For general practitioners with low role security and low therapeutic commitment at baseline, training and support made the role security and therapeutic commitment worse over time. Undertaking high screening and brief intervention rates had no impact on increases in role security and therapeutic commitment at six months follow-up for those practitioners who were already role secure and therapeutically committed. Undertaking high brief intervention rates actually made those who were already insecure in their role at baseline worse over time.

DISCUSSION

The findings demonstrated the importance of general practitioners' attitudes in affecting the relationship that training and support had on increased screening and brief intervention. Moreover, initial attitudes affected the relationships that training and support and screening and brief intervention had on subsequent changes in attitudes. Training and support only increased screening and brief intervention rates for those who were already role secure and therapeutically committed. Both role security and therapeutic commitment deteriorated over the course of the study. Providing support did not improve subsequent role security and therapeutic commitment and for those who were already role insecure and therapeutically uncommitted, actually made their role security and therapeutic commitment worse. The experience of screening and brief intervention did not increase role security and therapeutic commitment. For those who were already role insecure, the experience of brief interventions actually made role security worse.

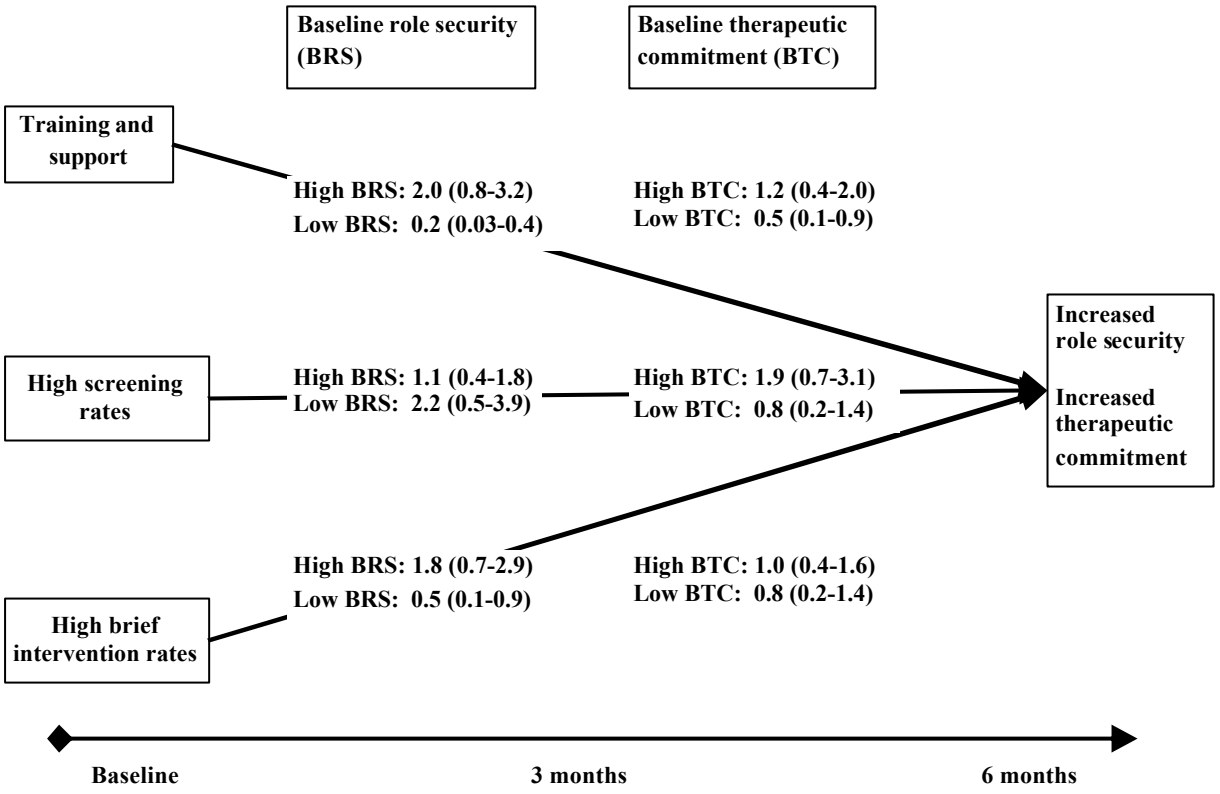

Figure 9.2 Odds ratios (95%CI)* for the impact of training and support, high screening rates and high brief intervention rates on increased role security and therapeutic commitment at 6 months follow-up in the presence of high and low role security (BRS) and therapeutic commitment (BTC) at baseline.
* Separate multilevel logistic regression analyses for each independent variable on its own with country as random nesting factor, controlling for the age and the gender of the general practitioner.

The strength of the present analysis lies in the fact that it includes objective reported outcome measures for screening and brief intervention rates from a large number of general practitioners (340) across four countries and regions. The analysis allowed for the inference of paths of causality. Role security and therapeutic commitment and the provision of training and support were measured prior to the measurement of screening and brief intervention rates. There were subsequent measurements of role security and therapeutic commitment after the training and support intervention and the experience of screening and brief intervention.

In general, the sample was less secure in their role and less therapeutically committed than the similar, but much larger sample of general practitioners across nine countries analyzed in earlier survey-based work from the World Health Organization collaborative study (Anderson, Kaner *et al.* submitted for publication). The general practitioners undertook very little activity for the management of alcohol problems, with as little as one in five of the control group (most equivalent to normal general practice) screening 20 or more percent of their patients and advising 10 or more percent of their at risk patients.

In the present study, although providing training and support did increase screening and brief intervention rates, its full potential was not realized probably beacsue the emotional responses of the general practitioners were not addressed. In the training and support group, the general practitioners received initial training in the use of the programme with a practice based visit together with ongoing advice and support on programme implementation issues, addressing the attitudes and beliefs of the general practitioners, patient intervention issues and structural and logistic issues. It is difficult to judge the quality with which the individual interventions were given, and it may have been that the short initial training session and continued support were not sufficient to deal with the emotional responses that are raised in the management of alcohol problems.

Shaw *et al*. (1978) proposed that simple education alone would not be enough to improve general practitioners' management of alcohol problems, and that a combination of education and training and the provision of a supportive working environment would be required. At the practice level, there is some evidence to support the value of on-site support agents (e.g. facilitators) to act as role models, coaches and colleagues in shared care arrangements for dealing with what could be described as more sensitive and non-traditional areas of care (Richmond & Anderson 1994; Rush *et al*. 1995).

It may also be that intensive interventions targeted at professional development and organizational changes in the practice are required. An intervention that provided two and half hours training in counselling supplemented with an office based support system that screened patients, cued providers to intervene, and made patient materials available had a major impact on improving alcohol counselling as measured at patient exit interview (OR=12.9; 95%CI, 0.1-15.8). This effect was stable over 32 months of follow-up (Adams *et al*. 1998).

Finally, the calculations of the intra-class correlations showed that a sizeable proportion of the variance in role security and therapeutic commitment, and screening and brief intervention were explained by the country or region of the general practitioner. Thus, although the results were consistent across the countries it may be that the provision of support would need to be adjusted to the particular characteristics of the primary health care system and possibly to wider cultural factors in each society. This is the aim of the ongoing Phase IV study of the World Health Organization collaborative project on the detection and management of alcohol-related problems in primary health care (Heather 2001).

CONCLUDING REMARKS

A systematic review (Anderson, Laurant *et al*. submitted for publication; see Chapter 8) and the findings of the World Health Organization collaborative project of implementing brief interventions for hazardous and harmful alcohol consumption in primary health care suggested that professionally and organizationally based programmes would lead to increased engagement of general practitioners in the management of alcohol problems. But the situation appears to be more complicated in that there is an interaction between the provision of support, the general practitioners'

role security and therapeutic commitment and the management of alcohol problems. Indeed, the present analysis would suggest that in the absence of role security and therapeutic commitment, the impact of professionally and organizationally based programmes is considerably diminished. Although the importance of acquiring experience of dealing with drinking problems in a supportive environment has been emphasized as a crucial element in securing professional commitment for the detection and management of alcohol problems, unless the emotional responses of the general practitioners are taken into account, the impact of such support will not achieve its full potential. Perhaps this might be a crucial approach that future research and programme development should bear in mind.

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CHAPTER 10

CONCLUSION: WHAT GENERAL PRACTICE CAN DO

SUMMARY

Four research questions were considered in this thesis: what is the risk of alcohol for health; can brief interventions given in general practice reduce the risk of alcohol; what are the attitudes of general practitioners to reducing the risk of alcohol; and, how can the involvement of general practice in reducing the risk of alcohol best be increased.

The risk of alcohol The risk of alcohol was found to be not inconsiderable, occurring at doses a little over one drink a day and affecting a very wide range of harm. Alcohol's contribution to the many common physical and mental conditions seen in general practice needs to be addressed. The basic message for the use of alcohol is 'less is better', supported by policies that reduce the harm done by alcohol with resources commensurate in size with alcohol's contribution to the burden of disability.

Effectiveness of interventions General practice based interventions can be effective in reducing alcohol consumption and alcohol related harm by between 10% and 16% above that of control groups. Although improvements in effectiveness need to be identified, enough is known already to guide practitioners in the implementation of screening and brief intervention programmes. Health care systems need to ensure that such treatments are fully integrated within normal clinical care and reimbursed.

Attitudes General practitioners' attitudes towards working with alcohol use disorders have an impact on their behaviour. General practitioners' education and training on alcohol needs to take into account their attitudes and needs to focus on strengthening their therapeutic commitment. There may be merit in reframing alcohol use disorders as clinical disorders, similar to raised blood pressure, for which there is effective and cost effective behavioural treatment.

Involving general practice It is possible to increase the involvement of general practitioners in delivering screening and brief intervention programmes by between 8% and 18% above that of control groups which, if replicated at the societal level could have a huge impact on public health. Addressing and helping reframe the general practitioners' attitudes towards working with drinkers could improve the involvement further. Although there is a need for more high quality studies on the engagement of general practitioners in the management of alcohol problems that include patient outcome measures, programmes to change general practitioners' behaviour that are alcohol specific and employ a number of professionally and organizationally based strategies need to be implemented.

Bringing it all together The effective management of alcohol use disorders in general practice can impact on public health by reducing not only the amount of alcohol consumed by the drinker, but also by influencing the social milieu of the drinker. By removing a source of reciprocal influence that is likely to contribute to the maintenance of harmful alcohol use and alcohol dependence, the management of alcohol use disorders in general practice may diminish the global burden of disease attributable to alcohol.

INTRODUCTION

The aetiology and the course of alcohol use disorders are to a large extent explained by behavioural, environmental and life course factors (McLellan *et al.* 2000; Bacon 1973; Öjesjö 1981; Edwards 1989; Moos *et al.* 1990). Alcohol use disorders can be described as environmentally responsive (Curran *et al.* 1987; Pattison *et al.* 1977; Humphreys *et al.* 2002) clinical disorders; they are readily responsive to environmental policy factors, such as the price of alcohol and regulations on the availability of alcohol (Bruun *et al.* 1975; Edwards *et al.* 1994; Babor *et al.* submitted for publication); they are also readily responsive to treatment (Klingemann *et al.* 1992; Blomqvist 1998), whose impact is likely to be enhanced in the presence of effective environmental policies.

It has been argued that treatment systems should be part of the public health response to alcohol use disorders and should be accessible, available and affordable (Heather 1995; Humphreys & Tucker 2002); in particular, interventions aimed at drinkers with mild to moderate problems should be disseminated more broadly (Institute of Medicine 1990). Although primary health care has been charged with screening and brief intervention programmes to prevent and manage alcohol use disorders (Anderson 1996; Babor & Higgins-Biddle 2000), general practitioners find the integration of such interventions into routine clinical practice difficult (Heather 1996; Deehan *et al.* 1998). Among the reasons most often cited are that alcohol use disorders are not health issues to be managed in primary health care; the belief that there is not enough evidence for the effectiveness of interventions to reduce alcohol use disorders; a lack of therapeutic commitment and fear of antagonizing patients over a sensitive personal issue; and inadequate training and support for general practitioners in the management of alcohol use disorders.

Within a public health perspective, this thesis has studied the risk of alcohol and what general practice can do to reduce that risk. Four main research questions were posed: 1) what is the risk of alcohol for health; 2) can brief interventions given in general practice reduce the risk of alcohol; 3) what are the attitudes of general practitioners to reducing the risk of alcohol; and 4) how can the involvement of general practice in reducing the risk of alcohol best be increased.

This concluding chapter will discuss the findings of each of the four main research questions in turn, and consider proposals for future research, practice and policy that could contribute to a more effective response to the management of alcohol use disorders in general practice settings. It was pointed out in Chapter 1 that, whilst the thesis focused on the perspective of the provider, clients' perceptions of alcohol, and the social climate in which they live are important determinants of treatment seeking behaviour and the types of treatments that they receive (Klingemann 2001; Kaner *et al.* 2001).

I THE RISK OF ALCOHOL

What has been learnt from the scientific literature?

The paper presented in Chapter 2 (Anderson *et al*. 1993) was one of the first attempts to generate risk curves of the relationship between harm and consumption across a wide range of physical harm. The paper concluded that alcohol is a risk factor for a wide range of physical harm, with the risk of harm increasing with the overall volume of alcohol consumed. At levels of reported alcohol consumption of more than 20-30 g a day, all individuals were considered to accumulate risk of harm. The paper expressed concern about the possible association between alcohol and the risk of breast cancer. Whilst recognizing the potential of alcohol to reduce the risk of coronary heart disease, the paper noted the uncertainty about the size of the reduction in risk and the potential impact of confounders in explaining the relationship. At the time of the publication, there were a lack of studies to generate risk curves for intentional and unintentional injuries and for alcohol-related social harm, and little information was available about the relationship between patterns of drinking and the risk of harm. Chapter 3 reviewed the literature published since the early 1990s and extended the evidence base. Whilst confirming the conclusions of the previous review, Chapter 3 suggested that the levels of reported alcohol consumption at which individuals were at risk of accumulating harm, at 10-15 g of alcohol a day, were lower than previously considered. Further reviews and meta-analyses found a relationship between alcohol consumption and risk of breast cancer. The Collaborative Group on Hormonal Factors in Breast Cancer (2002) found no evidence that the relationship could be due to confounding of known risk factors for breast cancer. Although more studies have found that alcohol reduces the risk of coronary heart disease, meta-analyses have suggested that the size of the reduction in risk is both smaller and occurs at a lower level of alcohol consumption than previously considered. Concern still remains that the effect of alcohol on coronary heart disease, or at least some of it, might be explained by alcohol measurement problems and confounders that have not been adequately controlled in all studies. More studies have been published on the risk curves for intentional and unintentional injuries, which demonstrate that the risks increase with the volume of alcohol consumption, the frequency of high volume drinking occasions, and the volume of alcohol consumed during an occasion.

Recommendations for research

Although much is known about the relationships between alcohol consumption and the risk of harm, the present evidence suffers from being largely based on a restrictive number of population groups from high income countries; it would benefit from more extensive research from low and middle income countries, and from societies with differing levels of per capita alcohol consumption. Further, for many conditions, the cumulative impact of drinking over time has not been studied extensively. Perhaps one model that could be used to overcome these difficulties is the British study of doctors and smoking, which has been ongoing for over 50 years (Doll *et al*. 1994; Peto *et al*. 2000). A replicated study using sophisticated and repeated alcohol measures, accounting for a wide range of confounding factors could give an

accurate assessment of the risks of alcohol, the potential benefits of alcohol consumption and the change in risks with changes in the amount and patterns of alcohol consumed.

Recommendations for practice

Alcohol has been implicated in a very wide variety of health-related problems. Thus, as primary health care involves the treatment of many common physical and mental conditions, their causes in the use of alcohol need to be addressed. A number of bodies have looked at what the practitioner can make of the evidence.

An international symposium on moderate drinking and health hosted by the Addiction Research Foundation in Toronto in 1993 (Addiction Research Foundation 1994) proposed a number of recommendations on the use of alcohol that can guide the health information that practitioners give to their patients. Essentially, as a general rule, the symposium recommended that, to protect health, people should not consume more than 20 g of alcohol (two standard drinks) in any day and those who currently abstain from alcohol should not begin drinking in order to reduce their risk of developing health problems.

To identify which individuals a general practitioner could offer intervention, the World Health Organization developed AUDIT, a screening instrument for use in primary care with high reliability, sensitivity and specificity (Bohn *et al*. 1995; Conigrave *et al*. 1995). AUDIT consists of ten simple questions. High scores on three items, in the absence of elevated scores on the remaining items, suggest hazardous alcohol use. High scores on four other items suggest harmful alcohol use and high scores on the remaining three items imply the presence or emergence of alcohol dependence. Scores of 8 or more on the AUDIT predict a future risk of engaging in hazardous drinking, physical and social harm and health care utilization.

Recommendations for policy

The nature of the dose response relationships between alcohol and different aspects of harm are relevant for alcohol policy. Most high income countries consume alcohol well in excess of the minimum risk level for populations. Collectively, alcohol use disorders cause over 9% of the total disease burden in high income countries (World Health Organization 2002). These are net figures, where the alcohol-related beneficial effects on disease have already been subtracted. Thus, in such countries, policy which results in a reduction in alcohol consumption will also result in a reduction in harm.

II THE EFFECTIVENESS OF GENERAL PRACTICE IN REDUCING THE RISK OF ALCOHOL

What has been learnt from the scientific literature?

The papers presented in chapter 4, (Scott & Anderson 1990; Anderson & Scott 1992), concluded that there was sufficient evidence for the effectiveness of general practitioners' advice in reducing hazardous and harmful alcohol consumption, certainly

for male at risk drinkers and possibly for female at risk drinkers. At the time of the publication there had been only two other published studies (Heather at al 1987; Wallace *et al*. 1988) and there was a lack of evidence of predictors of effect. Chapter 5 reviewed the literature published since the early 1990s and extended the evidence base. The chapter confirmed that brief interventions given by primary health care providers for non-treatment seeking populations were effective in reducing alcohol consumption and alcohol-related harm for both men and women, with changes in alcohol consumption of between 10% and 16% in the intervention groups compared with the control groups at 6-12 months follow-up. The evidence base remains under-developed in identifying predictors of effect. The Phase II trial of the World Health Organization found that simple advice worked best for male patients who had experienced a recent alcohol-related problem, while brief counselling worked better for those who did not have a recent problem (World Health Organization 1992a). Project MATCH, probably one of the largest and statistically most powerful psychotherapy trials ever conducted for treatment seeking populations outside of primary health care, failed to confirm the hypothesis that overall outcomes of treatment could be improved when patients were matched to different types of treatment. Although pharmacotherapies are effective in reducing alcohol use disorders, they have been little used or studied in primary health care settings.

Recommendations for research

The evidence base for effective interventions is not only becoming more extensive, but is also improving in quality. However, there remains the issue of the extent to which the evidence is based on effectiveness as opposed to efficacy studies. Predictors of effect, including client characteristics, still need to be indentified. Emphasis needs to be given to developing more effective interventions, including additional studies on the potential for use of pharmacotherapy in primary health care settings. Whether or not the identification of more effective treatments would attract more clients to attend for treatment and would encourage more primary health care providers to offer treatment remains to be studied.

Cost effectiveness analyses of brief interventions for the management of alcohol use disorders in primary health care are needed for the planning and delivery of services. Studies of the costs of brief interventions in primary health care with estimates of their effectiveness in reducing disability adjusted life years need to be undertaken.

Recommendations for practice

Although the field would benefit from more research, enough is known already to guide practitioners in the implementation of screening and brief intervention programmes[1]. A systematic review of the literature concluded that the best screening instrument for use in primary care is the AUDIT (Fiellin *et al*. 2000a). AUDIT scores in the range 16-19 are considered hazardous and harmful alcohol consumption, which can be managed by a combination of simple advice, brief counselling and continued

[1] See Annexe 2, Guidance for screening and brief interventions for hazardous and harmful alcohol consumption.

monitoring, with further diagnostic evaluation indicated if the patient fails to respond or is suspected of possible alcohol dependence.

Based on the contents of evaluated interventions, three essential elements of brief counselling have been proposed, including the giving of brief advice, the assessment and tailoring of the advice to stages of change and the provision of follow-up (Babor & Higgins-Biddle 2001). Guidelines for clinical practice need to be developed and implemented (US Department of Health and Human Services 1995; Scottish Intercollegiate Guidelines Network, in press).

Recommendations for policy

Alcohol use disorders are recognized disorders within the WHO classification of mental and behavioural disorders (World Health Organization 1992). Member States who are signatories to the World Health Organization thus have an obligation to ensure that services are available for the treatment of alcohol use disorders. Treatment systems (Heather 1995; Humphreys & Tucker 2002) for alcohol use disorders need to go beyond those that currently serve highly dependent drinkers (Porter *et al.* 1999), recognizing that utilization rates are low for both dependent (Marlatt *et al.* 1997) and non-dependent harmful drinkers, and that there is great diversity in the preferences, needs and outcomes of people with alcohol use disorders (Weisner 1991; Klingemann *et al.* 1992; Schmidt & Weisner 1993;Weisner & Schmidt 1993; Tucker & King 1999; Klingemann *et al.* 2002; Simpson & Tucker 2002). Stepped care models of service delivery have been proposed (Sobell & Sobell 1999), in which the least intrusive and expensive intervention that is likely to be effective is the first line of treatment, and more intensive services are offered only if the initial step proves inadequate.

Since alcohol use disorders can be chronically relapsing conditions, it has been argued that it might be a better investment to expend less healthcare resources during each contact with the client (i.e. be less 'intensive'), thus allowing interventions to extend over a longer period (i.e. be more 'extensive') (Humphreys & Tucker 2002). With a positive and supportive environment, a brief intervention can be effective. But as dependence becomes greater and the environment is less supportive, and the task of change becomes harder, the intervention itself must become more extensive to compensate.

As argued both by the Institute of Medicine (1990) and by the World Health Organization (Babor & Higgins-Biddle 2001), services need to be broad based, with primary health care playing a crucial role. As described in chapter 5, treatments based in primary health care appear to be highly cost effective with savings to the health care system covering all the costs. Health care systems need to ensure that such treatments are fully integrated within normal clinical care and reimbursed.

III THE ATTITUDES OF GENERAL PRACTICE TO REDUCING THE RISK OF ALCOHOL

What has been learnt from the scientific literature?

The Maudsley Alcohol Pilot Project, which was set up in England in the 1970s to address the task of engaging primary health care providers in the management of the

harm done by alcohol, found that general practitioners failed to recognize and respond to drinking problems because they were insecure in their role and felt anxieties about their role adequacy, anxieties about their role legitimacy and anxieties about support in their role (Shaw *et al*. 1978). Their anxieties of role security were expressed at the emotional level as lack of therapeutic commitment measured by motivation, task specific self-esteem and work satisfaction in working with drinkers. Chapter 6, noting that the original Alcohol and Alcohol Problems Perception Questionnaire was a lengthy instrument, developed a shortened version of the scale, in the hope that it would prove useful to those who wanted a quick yet meaningful measure of general practitioners' attitudes to working with drinkers. Chapter 7 reported on an analysis of data from nine countries of a World Health Organization study using the shortened version of the scale. It was found that general practitioners who managed a greater number of patients for alcohol problems had received more education on alcohol, had higher role security and therapeutic commitment and perceived that they were working in a more supportive environment. The finding was present across the nine countries with differing health care systems.

Recommendations for research

Although much is known about the relationships between the attitudes of the general practitioners, the perceived barriers and facilitators and the management of alcohol use disorders, how best to proceed is still not clearly understood. It is not known what determines attitudes towards working with drinkers and why some general practitioners have positive attitudes and others do not. It does seem that both professional training and education on alcohol and the perception of working in a supportive environment does have an influence on attitudes, but it is not known which elements of training and which elements of support influence which attitudes.

A research line that might be worth pursuing would consider, perhaps through the use of communication strategies and social marketing techniques derived from alcohol-related community prevention research (Giesbrecht & Ferris 1993; Holmila 1995), how best to reframe general practitioners' attitudes towards working with drinkers, so that they perceive alcohol use disorders as a condition to which, at both a professional and emotional level, they are therapeutically committed.

Recommendations for practice

Professional education and training for primary health care providers needs to take into account the providers' attitudes and emotions towards working with alcohol use disorders and needs to focus on strengthening the providers' therapeutic commitment. The educational principles of training primary health care providers for the management of alcohol use disorders have been summarized (Anderson 1991a; Anderson 1996). An expert group of the World Health Organization (World Health Organization 1992b) recommended that education and training in alcohol and alcohol-related problems, for adoption by medical colleges or faculties of general practice, should develop in primary health care doctors the knowledge, skills and attitudes needed to deal with alcohol use and alcohol-related problems. The recommendations were followed with the development and implementation of a training course, "Skills

for Change" (World Health Organization 1998), an interactive skill based training programme designed to increase the therapeutic commitment and skills of general practitioners in the management of alcohol use disorders.

Recommendations for policy

The studies of general practitioners' attitudes have indicated that the management of alcohol use disorders is a difficult issue because it is an emotive issue and one that brings with it a number of contradictions. General practitioners find alcohol a more difficult issue than other preventive areas, such as tobacco, nutrition or physical activity (Saunders & Wutzke 1998).

In the 1980s, the report of the Royal College of General Practitioners of the United Kingdom, "Alcohol, a Balanced View", took a behavioural approach to the management of harmful drinking (Anderson *et al*. 1986):

> "We do not subscribe to the view that alcoholism is in itself a disease. Instead the framework we offer sees everyone's drinking as spread along a continuum from harm free drinking at one end to harmful drinking at the other. An individual's drinking behaviour is learned and modified by experience; at any stage it is determined by a balance of the advantages and disadvantages, of the pleasures and the harms, of drinking. Everyone, whatever their current level of drinking, has the choice to move forward or backward along this continuum."

The World Health Organization has taken a more clinivcal approach with, in its ICD 10 classification of mental and behavioural disorders, the use of the term alcohol use disorders, including disorders from acute intoxication, harmful use and dependence (World Health Organization 1992c). Clear diagnostic criteria are outlined, and the risk of dependence meeting these criteria increases with increasing levels of alcohol consumption. The dependence syndrome includes, amongst other symptoms: a strong desire or sense of compulsion to take alcohol; difficulties in controlling alcohol-taking behaviour in terms of its onset, termination or levels of use; and persisting with alcohol use despite clear evidence of overtly harmful consequences. Disorder is not defined as an exact term, but rather the existence of a clinically recognizable set of symptoms or behaviour associated in most cases with distress and with interference with personal functions.

From the perspective of policy, consideration needs to be given as to which is the best approach to be taken to support primary health care providers in their work, a more behavioural or a more clinical approach. There may be merit in reframing the harm done by alcohol into the concept of alcohol use disorders, defining these as clinical disorders for which there is available effective and cost effective behavioural treatment. It is possible that by taking a more clinical approach, similar to the management of raised blood pressure, general practitioners might find it easier to incorporate the management of alcohol use disorders into their everyday work and might be more therapeutically committed in so doing.

IV INVOLVING GENERAL PRACTICE IN THE REDUCING THE RISK OF ALCOHOL

What has been learnt from the scientific literature?

Although much is known about changing practitioners' behaviour in the field of preventive medicine (Hulscher *et al.* 2002), because of the emotion and contradictions attached to it, alcohol is a special issue, dissimilar to other clinical conditions, such as the prevention and management of raised blood pressure. Chapter 8 found very few good quality studies that have investigated the effectiveness of strategies to engage general practitioners in the management of alcohol use disorders. Nevertheless, it was found that interventions were effective, and that alcohol specific interventions and interventions that were multi-faceted were more effective. The findings were similar to a review of strategies to engage general practitioners in the management of tobacco use disorders, in which tobacco specific and both professional and organizationally based interventions were found to be effective (Jané-Llopis & Anderson; submitted for publication).

None of the trials reviewed in chapter 8 reported on the impact of general practitioners attitudes on the effectiveness of the interventions. In view of the previous research on the importance of attitudes, chapter 9 studied the interactions of attitudes and support to engage general practitioners in the management of alcohol use disorders in four countries of a World Health Organization study. It was found that although support was effective in engaging general practitioners in the implementation of screening and brief intervention programmes, in the presence of low role security and therapeutic commitment, the impact of the support on screening activities was considerably diminished or non-existent. Role security and therapeutic commitment deteriorated over the course of the study, were not affected by the support given, and for those practitioners who were originally insecure in their role and therapeutically uncommitted, the support actually made their role security and therapeutic commitment worse.

Recommendations for research

Only 34 studies were identified in the literature review reported on in Chapter 8. There is thus a pressing need for more research on the effectiveness of strategies to engage general practitioners in the management of alcohol use disorders. Not only were very few studies identified, but only twelve out of the 34 met the inclusion criteria of the EPOC. Thus there is not only a pressing need for more research, but also a pressing need for more high quality research. None of the twelve studies reported patient behaviour outcome measures. So, there is an urgent need for high quality studies that include patient outcome measures, such as drinking behaviour or alcohol related harm.

Studies also need to measure the impact of different intervention strategies that are theory based. Are organizational based strategies more effective or not for screening activities? Are professional based strategies more effective or not for intervention activities? Are strategies aimed at practitioners in training more or less effective than strategies aimed at accredited practitioners and for which type of activity, screening or intervention. Studies should include measurements of the attitudes of general practitioners, with consideration of how role security and therapeutic commitment

might influence the impact of the interventions and how the attitudes themselves might be modified. Finally, intervention studies need to include elements of cost, so that cost effectiveness calculations can be made.

Recommendations for practice

Although there is a need for continued research, existing knowledge has demonstrated that programmes can increase the involvement of general practitioners in the management of alcohol use disorders and there needs to be a much greater investment in the implementation of such programmes. It seems that the programmes should be alcohol specific and employ a number of different strategies, both professionally and organizationally based. However, it also needs to be recognized that there is no straightforward solution to the engagement of general practitioners in the management of alcohol use disorders. If the attitudes of the general practitioners are not taken into account, if intervention programs are not specially customised for general practitioners, if understanding of the management of alcohol problems is not reframed and if strategic alliances between those supporting widespread implementation are not built, it is unlikely that the implementation will be successful (World Health Organization 2003). Problems will happen when solutions are too simply forced onto general practitioners (Beich *et al.* 2002). As the Maudlsey Alcohol Pilot project emphasized in the 1970s, acquiring experience of dealing with drinking problems in a supportive environment is perhaps the crucial element for successful engagement of general practitioners in this work (Shaw *et al*. 1978). By changing the environment in which general practitioners work, security in their role and therapeutic commitment might be increased.

Recommendations for policy

The management of alcohol use disorders is only likely to be effective in the presence of effective environmental alcohol policies. Alcohol policy needs to be implemented with resources, commensurate in size with alcohol's contribution to the burden of disability. Effective interventions are possible for reducing alcohol use disorders which offer significant scope for health gain. Objectives and targets related to alcohol use disorders can be set and progress towards them monitored (Anderson & Lehto 1995).

The risk associated with alcohol consumption can be reduced by adopting regulatory policies, action at the community level and risk reduction initiatives based in primary health care (Anderson 1991b; Edwards *et al*. 1994; Babor *et al.* submitted for publication). Reducing the risk requires political will and the implementation of policy that is evidence based, and formulated by public health interests, without interference from commercial interests (World Health Organization 2001).

Regulatory and treatment policies to reduce the harm done by alcohol have been traditionally implemented as largely unrelated activities. A more holistic approach is needed if regulatory and treatment policies are to address the complete spectrum of alcohol use disorders. Despite evidence of the effectiveness of treatment interventions, there has been little attention to the mechanisms of action that would translate individual effects to the population. Treatment interventions are designed primarily to

serve the needs of individual patients, but there are a number of ways that these interventions may have an impact at the level of the community and the population: by raising public awareness, by influencing national and community agendas, by involving health professionals in advocacy for public policy prevention, and by providing secondary benefits for the economies of individuals, families and communities (Anderson 1996). The effect of treatment interventions can also be manifested more directly by reducing not only the amount of alcohol consumed by the drinker, but also by influencing the social milieu of the drinker. By removing a source of reciprocal influence that is likely to contribute to the maintenance of harmful alcohol use and alcohol dependence (Skog 1985), treatment may diminish the global burden of disease attributable to alcohol.

BRINGING IT ALL TOGETHER

Public health criteria state that individually-directed interventions for alcohol use disorders should not be initiated unless: 1) there is a clear consensus about the definition of alcohol use disorders; 2) the natural history of alcohol use disorders is understood; 3) accurate screening tests have been developed to identify persons with alcohol use disorders; 4) there is good evidence for intervention effectiveness to manage persons with alcohol use disorders; and 5) the cost and potential benefits of implementing a state-of-the art approach have been considered (Babor & Higgins-Biddle 2000). During the past 15 years the first three prerequisites for a public health approach based on individually-directed interventions to alcohol problems have been advanced through improvements in screening, diagnosis and nomenclature on an international level (World Health Organization 1992c; Fiellin *et al.* 2000a; Fiellin *et al.* 2000a). Considerable progress has also been made in the development of cost-effective treatments, both brief interventions and more intensive therapies, to manage persons whose drinking places them at risk (Moyer *et al.* 2002). To the extent that the prerequisites for a public health approach have been established, it is important to design and implement strategies to disseminate cost effective interventions so that such interventions will be available to those who need them. One example of such an approach is the Phase IV study of the World Health Organization, development of country-wide strategies for implementing early identification and brief intervention programmes in primary health care (World Health Organization 2003).

The work presented in this thesis has spanned fifteen years of interrupted research in the fields of primary health care, public health and alcohol.

The research has demonstrated that the risk associated with the use of alcohol is not inconsiderable; it occurs at doses a little over one drink a day and it affects a very wide range of conditions. Original estimates of attributable mortality (Anderson 1988) have been confirmed by more recent findings (World Health Organization 2002). Concern that alcohol might be a causative agent in breast cancer (Turner & Anderson 1990a), a cancer that affects up to 10% of women in high income countries, has grown (Collaborative Group on Hormonal Factors in Breast Cancer 2002). Concern that some of the reduction in risk of cardiovascular disease caused by alcohol might be due to confounders (Turner & Anderson 1990b) has not gone away (see chapter 3).

The research demonstrated that advice from general practitioners to at risk drinkers can be effective in reducing that risk, a finding confirmed by subsequent studies. The question of how to increase the effectiveness of this advice still remains. A line of enquiry that might be worth considering is the appropriateness and effectiveness of the use of pharmacotherapy in primary health care settings.

The research demonstrated that it is possible to measure general practitioners' attitudes towards working with alcohol use disorders and that such attitudes have an impact on general practitioners' behaviour. Although education and training appears to have an impact in improving practitioners' attitudes, the best elements of training and education that could improve practitioners' role security and therapeutic commitment remain to be described.

Finally, the research demonstrated that it is possible to increase the involvement of general practitioners in delivering screening and brief intervention programmes, which, if replicated at the societal level could have a huge public health impact. Nevertheless, it was found that unless the general practitioners' attitudes, their emotional responses and the contradictions around the use of alcohol are taken into account, the impact of such interventions will be much compromised. It was suggested that in order to support general practitioners in their role, there may be merit in reframing the harm done by alcohol into the concept of alcohol use disorders, defining these as clinical disorders for which there is available effective and cost effective behavioural treatment.

Thom & Tellez (1986) described alcohol and general practice as a 'difficult business'. One of the general practitioners in their study stated:

> "One of the things I don't do is ask too many questions because I don't want to uncover a whole lot of things I can't deal with. So my technique sounds awful but it is to wait until something comes to my attention generally. I am not going hunting out problems I don't know how to treat. I could spend hours and hours every day trying to deal with it. Now if it were obvious how I could deal with it effectively then I might go looking for a few patients."

Hopefully, the work reported in this thesis has gone a little way to help this general practitioner.

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ANNEXE 1

WHO COLLABORATIVE STUDY QUESTIONNAIRE FOR GENERAL PRACTITIONERS (PHASE III, STRAND 1)

WHO COLLABORATIVE STUDY Questionnaire
For General Practitioners

OFFICE USE ONLY
ID no

Please tick the box corresponding to your answer or write your answer where indicated.
All answers to this questionnaire will be treated in confidence.

1. Are you presently active in general practice?

Yes ☐
No ☐ If no, please return questionnaire. Thank you for your assistance

1 ☐

2. How many years have you been practising as a general or family practitioner?

☐ years

2 ☐

3. In which year were you born?

19 ☐

3 ☐

4. What is your gender?

Male ☐
Female ☐

4 ☐

5. Is you practice a:

Urban practice? ☐
Rural practice ☐
Mixed Urban/Rural practice ☐

5 ☐

6. Is it a:

Solo practice? ☐
Group practice? ☐
Other>? ☐ Please specify .....

6 ☐

7. How many partners are there in the practice, including yourself?

☐

7 ☐

8. How many days per week do you work in general practice?

☐

8 ☐

9. How many general practice patients would you see in an average week?

0 – 50 ☐
50 – 100 ☐
101 – 150 ☐
More than 150 ☐

9 ☐

10. In total, how many hours of post-graduate training, continuing medical education or clinical supervision on alcohol and alcohol-related problems have you ever received?

None ☐
Less than 4 hours ☐
4 - 10 hours ☐
11 – 40 hours ☐
More than 40 hours ☐
Don't know/Can't remember ☐

10 ☐

11. On an average week, about what percentage of your total general practice clinical time would you say was **preventive** in nature? (*That is, visits where the patient's principal reason for the visit is primarily preventive care, such as annual or periodic check-ups, pre-natal, or pap smears etc.)*

_____ percent of time

11 ☐

12. As part of a **preventive check-up,** how often do you educate your patients or advise them about their lifestyles and health risks? Would you say –

All the time? ☐
Most of the time? ☐
Some of the time? ☐
Rarely or never? ☐

12 ☐

13. For patients who come in for an **illness visit**, that is, with specific symptoms,how often do you educate or advise them about their lifestyles or health risks? Would you say –

All the time? ☐
Most of the time? ☐
Some of the time? ☐
Rarely or never? ☐

13 ☐

14. If the patient doesn't ask you about alcohol, do you ask about it?

All the time? ☐
Most of the time? ☐
Some of the time? ☐
Rarely or never? ☐

14 ☐

15. Please list the typical conditions which elicit your talking about alcohol

_____
_____
_____
_____
_____

15 ☐

16. At the present time, taking into consideration all your current responsibilities with patients, how high a priority do you place on disease prevention as an aspect of your practice?

Very high ☐
Somewhat high ☐
Somewhat low ☐
Very low ☐

16 ☐

17. Compared to other medical practitioners you know, how much emphasis do you place on disease prevention in your practice?

Much more ☐
Somewhat more ☐
Somewhat less ☐
Much less ☐

17 ☐

18. The following are behaviours that some health professionals believe to be related to health. How important do you think each of the following behaviours are in **promoting the health of the average person?** *(Please circle one number for each).*

Behaviour	Very important	Important	Somewhat important	Unimportant
a. Not smoking	4	3	2	1
b. Exercise regularly	4	3	2	1
c. Drinking alcohol moderately	4	3	2	1
d. Not drinking alcohol at all	4	3	2	1
e. Avoiding excess calories	4	3	2	1
f. Reducing stress	4	3	2	1
g. Responsible use of prescription drugs	4	3	2	1
h. Not using illicit drugs	4	3	2	1

18 ☐
19 ☐
20 ☐
21 ☐
22 ☐
23 ☐
24 ☐
25 ☐

19. Please indicate **the extent to which you obtain information** on your patients in each of the following areas: *(Please circle one for each)*

Behaviour	Always	As indicafted	Occasionally	Rarely/Never
a. Not smoking	4	3	2	1
b. Exercise regularly	4	3	2	1
c. Drinking alcohol moderately	4	3	2	1
d. Not drinking alcohol at all	4	3	2	1
e. Avoiding excess calories	4	3	2	1
f. Reducing stress	4	3	2	1
g. Responsible use of prescription drugs	4	3	2	1

26 ☐
27 ☐
28 ☐
29 ☐
30 ☐
31 ☐
32 ☐

20. Doctors vary in their counselling skills and training. How **prepared** do you feel when counselling patients in each of these areas: *(Please circle one for each).*

Behaviour	**Very Prepared**			**Very Unprepared**	
a. Not smoking	4	3	2	1	33
b. Exercise regularly	4	3	2	1	34
c. Reducing alcohol consumption	4	3	2	1	35
d. Avoiding excess calories	4	3	2	1	36
e. Reducing stress	4	3	2	1	37
f. Responsible use of prescription drugs	4	3	2	1	38
g. Not using illicit drugs	4	3	2	1	39

21. How **effective** do you feel you are in helping patients achieve change in each of the following areas? (*Please circle one number for each).*

Behaviour	**Very Effective**			**Very Ineffective**	
a. Not smoking	4	3	2	1	40
b. Exercise regularly	4	3	2	1	41
c. Reducing alcohol consumption	4	3	2	1	42
d. Avoiding excess calories	4	3	2	1	43
e. Reducing stress	4	3	2	1	44
f. Responsible use of prescription drugs	4	3	2	1	45
g. Not using illicit drugs	4	3	2	1	46

22. In general, **given adequate information and training,** how effective do you feel general practitioners **could** be in helping patients change behaviour in each of the following areas? *(Please circle one number for each).*

Behaviour	**Very Effective**			**Very Ineffective**	
a. Not smoking	4	3	2	1	47
b. Exercise regularly	4	3	2	1	48
c. Reducing alcohol consumption	4	3	2	1	49
d. Avoiding excess calories	4	3	2	1	50
e. Reducing stress	4	3	2	1	51
f. Responsible use of prescription drugs	4	3	2	1	52
g. Not using illicit drugs	4	3	2	1	53

23. For a healthy adult man, what would you consider the upper limit for alcohol consumption before you would advise him to cut down?

Please record as ..... grams of alcohol per week 54

or as ..... standard drinks* per week 55

For a healthy adult woman, who is not pregnant, what would you consider the upper limit for alcohol consumption before youwould advise her to cut down?

Please record as ..... grams of alcohol per week 56

or as ..... standard drinks* per week 57

* 1 standard drink = 1 middy of beer = 1 glass of wine = 1 small glass of sherry or port = 1 nip of spirits

24. Case History A

Mr M is a 48 year old man who presents for a physical examination. The patient lives alone and has been a member of your practice for about three years. He has attended intermittently during this time. He provides a history of sleep disturbance, which consists of waking some 3-4 hours after falling asleep and then experiencing difficulty getting back to sleep. He also reports occasional dyspepsia relieved by ingestion of alkali preparations from the chemist. Upon your inquiry, he reports giving up smoking about four years ago. He does, however, report drinking alcohol and states that his average weekly consumption is about 20 pints of beer and about 5-6 glasses of table wine. History and functional inquiry are unremarkable in all other respects.

On physical examination, the patient is noted to be moderately obese, of neat appearance and otherwise unremarkable. Pulse was 88 beats per minute and regular. Blood pressure was 144/94. Respiratory rate was 20 per minute. The remainder of the physical examination was completely normal.

With respect to Mr M's use of alcohol: *(Please circle on number for each question).*

a. Please rate the severity of this particular patient's drinking

Not a problem									An extremely severe problem	
0	1	2	3	4	5	6	7	8	9	58 ☐

b. Please rate the importance for this particular patient to stop drinking altogether.

Of no importance									The greatest possible importance	
0	1	2	3	4	5	6	7	8	9	59 ☐

c. Please rate your confidence in helping this particular patient to alleviate drinking problems even if not to stop altogether

No confidence									The greatest possible confidence	
0	1	2	3	4	5	6	7	8	9	60 ☐

Which of the following courses of action would you take, if you were his general practitioner? *(Please tick one box for each question).*

d.	Ask some further questions about drinking to gauge the possibility of an underlying alcohol problem	Yes ☐	No ☐	61 ☐
e.	Indicate that alcohol is possibly related to some of his associated problems	Yes ☐	No ☐	62 ☐
f.	Record Mr M's weekly alcohol consumption in the chart but otherwise take no action concerning his use of alcohol at this time	Yes ☐	No ☐	63 ☐
g.	Record Mr M's weekly alcohol consumption in the chart and advise him to cut back on his drinking	Yes ☐	No ☐	64 ☐
h.	Record Mr M's weekly alcohol consumption in the chart and advise him to abstain completely from alcohol	Yes ☐	No ☐	65 ☐
i.	Order a complete blood count, indices and liver enzymes	Yes ☐	No ☐	66 ☐
j.	Ask Mr M to return for a discussion of his alcohol use	Yes ☐	No ☐	67 ☐
k.	Refer Mr M to an outside specialist/agency for his drinking	Yes ☐	No ☐	68 ☐

25. Case History B

Mr R is a 54 year old man presenting with a chest infectioninvolving the lower respiratory tract. The patient lives on his own and first attended your practice about three and a half years ago. He has attended intermittently during this time. His chest infection has been recurring and this is the third presentation in the past 12 months. The patient was a heavy smoker but reports giving it up about five years ago. He does, however, report drinking alcohol and states that his weekly consumption averages about 20 pints of beer and one bottle of vodka.

Investigation reveals evidence of early pneumonia. On examination of his abdomen, his liver is significantly enlarged with a firm, tender lower border. He has a fine tremor in his hands and his blood pressure was noted to be 180/110

With respect fo Mr R's use of alcohol: *(Please circle one number for each question).*

a. Please rate the severity of this particular patient's drinking

Not a problem									An extremely severe problem	
0	1	2	3	4	5	6	7	8	9	69 ☐

b. Please rate the importance for this particular patient to stop drinking altogether.

Of no importance									The greatest possible importance	
0	1	2	3	4	5	6	7	8	9	70 ☐

c. Please rate your confidence in helping this particular patient to alleviate drinking problems even if not to stop altogether

No confidence									The greatest possible confidence	
0	1	2	3	4	5	6	7	8	9	71 ☐

Which of the following courses of action would you take, if you were his general practitioner? *(Please tick one box for each question).*

d.	Ask some further questions about drinking to gauge the possibility of an underlying alcohol problem	Yes ☐	No ☐	72 ☐
e.	Indicate that alcohol is possibly related to some of his associated problems	Yes ☐	No ☐	73 ☐
f.	Record Mr R's weekly alcohol consumption in the chart but otherwise take no action concerning his use of alcohol at this time	Yes ☐	No ☐	74 ☐
g.	Record Mr R's weekly alcohol consumption in the chart and advise him to cut back on his drinking	Yes ☐	No ☐	75 ☐
h.	Record Mr R's weekly alcohol consumption in the chart and advise him to abstain completely from alcohol	Yes ☐	No ☐	76 ☐
i.	Order a complete blood count, indices and liver enzymes	Yes ☐	No ☐	77 ☐
j.	Ask Mr R to return for a discussion of his alcohol use	Yes ☐	No ☐	78 ☐
k.	Refer Mr R to an outside specialist/agency for his drinking	Yes ☐	No ☐	79 ☐

26. Indicate how much you agree or disagree with each of the following statements about working with "problem drinkers". For this part of the question, "problem drinkers" refers to people with **hazardous or harmful alcohol use,** but excludes people dependent on alcohol.

Statement	Strongly agree	Quite strongly agree	Agree	Neither agree of disagree	Disagree	Quite strongly disagree	Strongly disagree	
a. I feel I know enough about the causes of drinking problems to carry out my role when working with problem drinkers	7	6	5	4	3	2	1	80
b. I feel I can appropriately advise my patients about drinking and its effects	7	6	5	4	3	2	1	81
c. I feel I do not have much to be proud of when working with drinkers	7	6	5	4	3	2	1	82
d. All in all I am inclined to feel a failure with drinkers	7	6	5	4	3	2	1	
e. I want to work with drinkers	7	6	5	4	3	2	1	83
f. Pessimism is the most realistic attitude to take towards problem drinkers	7	6	5	4	3	2	1	84
g. I feel I have the right to ask patients questions about their drinking when necessary	7	6	5	4	3	2	1	85
h. I feel that my patients believe I have the right to ask them questions about drinking when necessary	7	6	5	4	3	2	1	86
i. In general it is rewarding to work with drinkers	7	6	5	4	3	2	1	87
j.In general, I like problem drinkers	7	6	5	4	3	2	1	88

27. Indicate how much you agree or disagree with each of the following statements about working with people who are **dependent on alcohol or have a severe problem with alcohol ("alcoholics").**

Statement	Strongly agree	Quite strongly agree	Agree	Neither agree of disagree	Disagree	Quite strongly disagree	Strongly disagree	
a. I feel I know enough about the causes of drinking problems to carry out my role when working with problem drinkers	7	6	5	4	3	2	1	89
b. I feel I can appropriately advise my patients about drinking and its effects	7	6	5	4	3	2	1	90
c. I feel I do not have much to be proud of when working with drinkers	7	6	5	4	3	2	1	91
d. All in all I am inclined to feel a failure with drinkers	7	6	5	4	3	2	1	92
e. I want to work with drinkers	7	6	5	4	3	2	1	93
f. Pessimism is the most realistic attitude to take towards problem drinkers	7	6	5	4	3	2	1	94
g. I feel I have the right to ask patients questions about their drinking when necessary	7	6	5	4	3	2	1	95
h. I feel that my patients believe I have the right to ask them questions about drinking when necessary	7	6	5	4	3	2	1	96
i. In general it is rewarding to work with drinkers	7	6	5	4	3	2	1	97
j. In general, I like problem drinkers	7	6	5	4	3	2	1	98

28. In the last year, how many times have you taken or requested a blood test (*eg blood alcohol, MCV, GGT*) **because of concern** about alcohol consumption? *(Please circle on number).*

Never 1
1 – 2 times 2
3 – 5 times 3

100

6 – 12 time 4
more than 12 times 5

29. In the last year, about how many patients have you managed specifically for their hazardous drinking or alcohol-related problems?

None 1 101
1 – 6 times 2
7 – 12 times 3
13 – 24 times 4
25 – 49 time 5
50 or more 6

30. In general, **given appropriate support**, to what extent do you feel General Practitioners **should** be involved in helping patients change behaviour in each of the following areas?

Behaviour	**Definitely involved**			**Definitely not involved**	
a. Not smoking	4	3	2	1	102
b. Exercise regularly	4	3	2	1	103
c. Promoting non-hazardous alcohol consumption	4	3	2	1	104
d. Providing alcohol information	4	3	2	1	105
e. Treating alcohol dependent drinkers	4	3	2	1	106

31. The final two questions are about early intervention for hazardous alcohol consumption. This involved screening patients to identify those whose alcohol consumption places them at increased risk of disease, and then counselling identified problem drinkers about reducing their alcohol consumption.

Inquiries in a number of countries have revealed that many doctors in general practice spend very little or no time at all on early intervention for alcohol. A variety of reasons have been suggested as to why this might be so. For each one please indicate to what extent you think that reason applies by circling the appropriate number.

Statement	**Very much**	**Quite a bit**	**Little**	**Not at all**	**Don't know**	
a Alcohol is not an important issue in general practice	5	4	3	2	1	107
b. Doctors are just toobusy dealing with the problems people present with	5	4	3	2	1	108
c. Doctors have a disease model training and they don't think about prevention	5	4	3	2	1	109
d. Doctors think that preventive health should be the patients responsibility not theirws	5	4	3	2	1	110
e. General practices are not organised to do preventive counselling	5	4	3	2	1	111
f. Doctors feel awkward about asking questions about alcohol consumption because saying someone has an alcohol problem could be seen as accusing them of being an alcoholic	5	4	3	2	1	112
g. Doctors do not know how to identify problem drinkers who have no obvioius symptoms of excess consumption.	5	4	3	2	1	113
Statement	**Very much**	**Quite a bit**	**Little**	**Not at all**	**Don't know**	
h. Doctors do not have a suitable screening device to identify problem drinkers who have no obvious symptoms of excess consumption	5	4	3	2	1	114
i. Doctors do not have suitable counselling materials available	5	4	3	2	1	115

j. Doctors are not trained in counselling for reducing alcohol consumption	5	4	3	2	1
k. Doctors believe that alcohol counselling involves family and wider social effects, and is therefore too difficult	5	4	3	2	1
l. Doctors do not believe that patients would take their advice and change their behaviour	5	4	3	2	1
m. Doctors themselves have a liberal attitude to alcohol	5	4	3	2	1
n. Doctors themselves may have alcohol problems	5	4	3	2	1
o. Doctors believe that patients would resent being asked about their alcohol consumption	5	4	3	2	1
p. The government health scheme does not reimburse doctors for time spent on preventive medicine	5	4	3	2	1
q. Government health policies in general do not support doctors who want to practise preventative medicine	5	4	3	2	1
r. Private health insurance does not reimburse patients for alcohol counselling by doctors in general practice	5	4	3	2	1

32. Doctors in a number of countries have suggested a variety of things that could lead to more doctors doing early intervention for hazardous alcohol consumption. Please indicate for each item to what extent it **would** encourage you personally to do more early intervention for hazardous alcohol consumption, by circling the appropriate response.

Statement	**Very much**	**Quite a bit**	**Little**	**Not at all**	**Don't know**	
a. Public health education campaigns in general made society more concerned about alcohol	5	4	3	2	1	125
b. Patients requested health advice about alcohol consumption	5	4	3	2	1	126
c. Patients were willing to pay a fee for alcohol counselling	5	4	3	2	1	127
d. Quick and easy screening questionnaires were available	5	4	3	2	1	
e. Quick and easy counselling materials were available	5	4	3	2	1	128
f. Early intervention for alcohol was proven to be successful	5	4	3	2	1	129
g. Training programs for early intervention for alcohol were available	5	4	3	2	1	130
h. Training in early intervention for alcohol was recognised for continuing medical education credits	5	4	3	2	1	131
i. Providing early intervention for alcohol was recognised for quality assurance credits	5	4	3	2	1	132
j. Support services were readily available to refer patients to	5	4	3	2	1	
k. Salary and working conditions were improved	5	4	3	2	1	133

33. If you would like to express further opinions or comment on the questionnaire or any other aspect of alcohol problems, please use the space below 134

ANNEXE 2

GUIDANCE FOR SCREENING AND BRIEF INTERVENTIONS FOR HAZARDOUS AND HARMFUL ALCOHOL CONSUMPTION

Why offer screening and brief intervention programmes?

There are many forms of alcohol use that can cause substantial risk or harm to the individual. They include high level drinking each day, repeated episodes of drinking to intoxication, drinking that is actually causing physical or mental harm, and drinking that has resulted in the person becoming dependent or addicted to alcohol. *Hazardous drinking* is a pattern of alcohol consumption that increases the risk of harmful consequences for the user or others (Babor et al 1994). *Harmful use* refers to alcohol consumption that results in consequences to physical and mental health (World Health Organization 1992). *Alcohol dependence* is a cluster of behavioural, cognitive, and physiological phenomena that may develop after repeated alcohol use (World Health Organization 1992). The risks related to alcohol are linked to the pattern of drinking and the amount of consumption (Anderson et al 1993). While persons with alcohol dependence are most likely to incur high levels of harm, the bulk of harm associated with alcohol occurs among people who are *not* dependent, if only because there are so many of them. Therefore, the identification of drinkers with various types and degrees of at-risk alcohol consumption has great potential to reduce all types of alcohol-related harm.

Of utmost importance for screening and brief interventions, however, is the fact that people who are *not* dependent on alcohol may stop or reduce their alcohol consumption with appropriate assistance and effort. Once dependence has developed, cessation of alcohol consumption is more difficult and often requires specialized treatment. Screening for alcohol consumption among patients in primary care provides an opportunity to educate patients about the risks of excessive alcohol use. Information about the amount and frequency of alcohol consumption may inform the diagnosis of the patient's presenting condition, and it may alert clinicians to the need to advise patients whose alcohol consumption might adversely affect their use of medications and other aspects of their treatment.

Screening for hazardous and harmful alcohol consumption

A systematic review of the literature has concluded that the best screening instrument for use in primary care is the AUDIT, (Fiellin et al 2000), a screening instrument with high reliability (Bohn et al 1995; Conigrave et al 1995), sensitivity and specificity. Scores of 8 or more on the AUDIT predict a future risk of engaging in hazardous drinking, physical and social harms and health care utilization. The AUDIT (See Box) can be self-completed or by interview (Babor et al. 2001).

The Alcohol Use Disorders Identification Test: Self-Report Version

PATIENT: Because alcohol use can affect your health and can interfere with certain medications and treatments, it is important that we ask some questions about your use of alcohol. Your answers will remain confidential so please be honest.
Place an X in one box that best describes your answer to each question.

Questions	0	1	2	3	4	
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					Total	

The AUDIT is easy to score. The number in the column of each response checked by the patient should be entered by the scorer in the extreme right-hand column. All the response scores should then be added and recorded in the box labelled "Total". Scores in the range 16-19 are considered hazardous and harmful alcohol consumption, which can be managed by a combination of simple advice, brief counselling and continued monitoring, with further diagnostic evaluation indicated if the patient fails to respond or is suspected of possible alcohol dependence (See Box).

Risk Level	Intervention	AUDIT Score*
Zone I	Alcohol Education	0-7
Zone II	Simple Advice	8-15
Zone III	Simple Advice plus Brief Counseling and Continued Monitoring	16-19
Zone IV	Referral to Specialist for Diagnostic Evaluation and Treatment	20-40

*The AUDIT cut-off score may vary slightly depending on the country's drinking patterns, the alcohol content of standard drinks, and the nature of the screening program. Consult the AUDIT manual for details. Clinical judgment should be exercised in the interpretation of screening test results to modify these guidelines, especially when AUDIT scores are in the range of 15-20.

Brief interventions for hazardous and harmful drinking

Primary care health providers are in a unique position to identify and intervene with patients whose drinking is hazardous or harmful to their health (Babor & Higgins-Biddle 2001). They may also play a critical role in leading patients with alcohol dependence to enter treatment. The primary health care setting is ideal for continuous monitoring and repeated intervention. Unfortunately, some primary care health workers are reluctant to screen and counsel patients in relation to alcohol use. Among the reasons most often cited are lack of time, inadequate training, fear of antagonizing patients, the perceived incompatibility of alcohol counselling with primary health care, and the belief that "alcoholics" do not respond to interventions.

Lack of time Because alcohol use is a leading contributor to many health problems encountered in primary care, screening and brief interventions can often be delivered in the course of routine clinical practice without requiring significantly more time. Screening requires only 2-4 minutes. Scoring and interpretation of the screening test takes less than a minute. Once the screening results are available, only a small proportion (5%-20%) of patients in primary care is likely to require a brief intervention. For those who screen positive, the intervention for most patients requires less than five minutes.

Inadequate training While it is true that professional education is often inadequate where alcohol is concerned, the required skills are not very different from those needed for many other conditions. Primary care providers are experienced in treating patients with diabetes and hypertension, who require initial identification through screening, counselling about behavioural change, and on-going support. This expertise will prove useful in providing similar help to hazardous and harmful drinkers.

Fear of antagonizing patients over a sensitive personal issue While denial and resistance are sometimes encountered from persons with alcohol dependence, harmful and hazardous drinkers are rarely uncooperative and are appreciative when health workers show an interest in the relationship between alcohol and health. In general, patients perceive alcohol screening and brief counselling as part of the health worker's role.

Alcohol is not a matter that needs to be addressed in primary health care This misconception is contradicted by the massive amount of evidence showing how alcohol is implicated in a very wide variety of health-related problems. Thus, if primary health care involves the treatment of many common physical and mental conditions, it must address their causes in the use of alcohol.

"Alcoholics" do not respond to primary care interventions. Alcohol dependence affects a small but significant proportion of the adult population in many countries (3%-5% in high income countries), but hazardous and harmful drinking generally affect a much larger portion of the population (15%-40%). Primary health care interventions identify and refer persons with alcohol dependence at an early stage in their drinking career, thereby preventing further progression of dependence. They also identify and help hazardous and harmful drinkers who may or may not develop an alcohol dependence syndrome, but whose risk of serious alcohol-related harm can be reduced.

Who is Appropriate for Brief Counselling?

An intervention using brief counselling is generally appropriate for persons who score on the AUDIT screening test in the range of 16 - 19. The goal of brief counselling is to reduce the risk of harm resulting from excessive drinking. Because the patient may already be experiencing harm, brief counselling includes an obligation to inform the patient that this action is needed to prevent alcohol-related medical problems.

Providing Brief Counselling

There are three essential elements of brief counselling.

1. Give Brief Advice

Give Feedback that the patient's drinking falls into the risky drinking category. Specific harm identified by the AUDIT and from the patient's presenting symptoms should be itemized, and the seriousness of the situation should be emphasized.

Provide Information on the specific risks of continued drinking at hazardous and harmful levels.

Enable a goal to be established by the patient to change drinking behaviour.

Give Advice on Limits Most patients are likely to choose a low risk drinking goal. They then need to agree to reduce their alcohol use to these "low-risk drinking limits".

Provide Encouragement Hazardous drinkers are not dependent on alcohol and can change their drinking behaviour. The health care worker should seek to motivate the patient by restating the need to reduce risk and by encouraging the patient to begin now.

2. Assess and Tailor Advice to Stage of Change

The stages of change represent a process that describes how people think about, initiate, and maintain a new pattern of health behaviour. The five stages summarized in the Box on the next page are each matched with a specific brief intervention element. One of the simplest ways to assess a patient's readiness to change their drinking is to use the "Readiness Ruler", in which the patient is asked to rate on a scale of 1 to 10, "How important is it for you to change your drinking?" (with 1 being not important and 10 being very important). Patients who score in the lower end of the scale are pre-contemplators. Those who score in the middle range (4-6) are contemplators, and those scoring in the higher range should be considered ready to take action. If the patient is at the pre-contemplation stage, then the advice session should focus more on feedback in order to motivate the patient to take action. If the patient has been thinking about taking action (contemplation stage), emphasis should be placed on the benefits of doing so, the risks of delaying, and how to take the first steps. If the patient is already prepared for taking action, then the health worker should focus more on setting goals and securing a commitment from the patient to cut down on alcohol consumption.

3. Follow-up

Maintenance strategies of providing support, feedback, and assistance in setting, achieving, and maintaining realistic goals should be built into the counselling plan from the beginning. This will involve helping the patient identify relapse triggers and situations that could endanger continued progress. Since patients receiving brief counselling are currently experiencing alcohol-related harm, periodic monitoring as appropriate for the degree of risk during and (for a time) after the counselling sessions

is essential. If the patient is making progress toward a goal or has achieved it, such monitoring may be reduced to a semi-annual or annual visit. However, if the patient continues for several months to have difficulties reaching and maintaining the drinking goal, consideration should be given to moving the patient to the next highest level of intervention, referral to extended treatment if it is available. If such specialized treatment is not available, regular monitoring and continued counselling may be necessary.

The Stages of Change and Associated Brief Intervention Elements[20]

Stage	Definition	Brief Intervention Elements to be Emphasized
Precontemplation	The hazardous or harmful drinker is not considering change in the near future, and may not be aware of the actual or potential health consequences of continued drinking at this level	**Feedback** about the results of the screening, and **Information** about the hazards of drinking
Contemplation	The drinker may be aware of alcohol-related consequences but is ambivalent about changing	Emphasize the benefits of changing, give **Information** about alcohol problems, the risks of delaying, and discuss how to choose a **Goal**
Preparation	The drinker has already decided to change and plans to take action	Discuss how to choose a **Goal**, and give **Advice** and **Encouragement**
Action	The drinker has begun to cut down or stop drinking, but change has not become a permanent feature	Review **Advice**, give **Encouragement**
Maintenance	The drinker has achieved moderate drinking or abstinence on a relatively permanent basis	Give **Encouragement**

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SUMMARY

THE RISK OF ALCOHOL
WHAT GENERAL PRACTICE CAN DO

INTRODUCTION

Chapter 1 starts by noting that the use of alcohol brings with it contradictions. It continues by referring to evolutionary study which suggests that human ancestors were exposed to low levels of dietary alcohol through eating fruit, a source of fermented alcohol and a major component of the diet. Early societies produced alcohol from a variety of different substances that were locally available. Global trade and economic factors largely determined drinking patterns.

In modern day society, less than half (49%) of the total adult population uses alcohol. Most of the alcohol is drunk by a small proportion of the consumers. Alcohol brings both pleasure and pain, with much of the pleasure based on expectancies. The pains are widespread; 25% of European men and 10% of European women consume alcohol at levels hazardous and harmful to their health; 10%-30% of drinking occasions include consumption of at least 60 g of alcohol; and 3% to 5% of adults are dependent on alcohol. Overall, alcohol use disorders contributed to 9% of the total disease burden in high income countries in the year 2000, a net figure, with alcohol-related benefits subtracted.

Prior to the 19th century, responses to intoxication and the harmful use of alcohol were concerned with moral attitudes and social behaviours regarded as sinful or criminal. The public health response to alcohol arose out of the temperance movements of the 19th and early 20th centuries. Present day alcohol policies focus on price measures, such as taxation; on non-price measures, such as controls on the marketing of alcohol; and on the management of alcohol use disorders, all of which are effective in reducing a wide range of alcohol-related harm.

Within the health care sector, general practice is charged with the role of implementing screening and brief intervention programmes to reduce the risk of alcohol. However, general practitioners find the management of alcohol use disorders difficult at both a technical and an emotional level. The reasons most often cited are: alcohol is not a health issue to be managed in primary health care; there is not enough evidence for effectiveness; fear of antagonizing patients over a sensitive personal issue, expressed as lack of therapeutic commitment; and inadequate training and support.

Chapter 1 concludes by listing the four main research questions which aim to address the concerns of general practitioners: 1) what is the risk of alcohol for health; 2) can brief interventions given in general practice reduce the risk of alcohol; 3) what are the attitudes of general practitioners to reducing the risk of alcohol; and 4) how can the involvement of general practice in reducing the risk of alcohol best be increased.

PART I THE RISK OF ALCOHOL

Although the relationship between alcohol consumption and a wide range of harm had been known for a long time, at the beginning of the 1990s little was published about the nature and shape of the curves describing the risk relationships between alcohol consumption and harm.

Chapter 2 is a systematic review of 156 published papers that examined the risk of physical harm in relation to alcohol consumption. The review, which presents a number of risk function curves on the relationship between alcohol consumption and harm, was first published in 1993 and updated in 1995. Although it is not possible to define individual risk for all types of harm at a given level of alcohol consumption, because of variations in methodology, the chapter notes that at reported levels of alcohol consumption of more than 20-30 g a day (two to three drinks), all individuals are likely to accumulate risk of harm.

Chapter 3 updates chapter 2 by describing the findings of the major reviews and meta-analyses that have been published during the ten years since 1993. Syntheses of high quality studies provide stronger evidence for the relationships between alcohol consumption and harm, at both the individual and at the population level. The risk of alcohol consumption for female breast cancer, which was not confounded by known risk factors, is confirmed. It is estimated that in high income countries, the cumulative incidence of breast cancer by age 80 years increases linearly from 8.8 per 100 women in non-drinkers to 13.3 per 100 women consuming an average of six alcoholic drinks each day.

A systematic review finds a clear relationship between recent and long term use of alcohol and the risk of stroke, with no clear evidence of a protective effect for the risk of ischaemic stroke. Consumption of a high volume of alcohol in a short period of time is found to increase the risk of myocardial infraction and sudden coronary death. Although meta-analyses have confirmed that alcohol can reduce the risk of coronary heart disease, the relationship is not consistent across all studies, the risk of coronary heart disease is increased at higher levels of alcohol consumption, and concerns remain about the role of confounding variables. The size of the reduction in risk for coronary heart disease (20%) is found to be smaller and to occur at a lower level of alcohol consumption (20 g alcohol, two drinks, per day) than that found in chapter 2.

Studies have stressed the importance of patterns of drinking, as well as the volume of alcohol consumption, for the risk of alcohol-related intentional and unintentional injuries and for the social consequences of alcohol consumption.

In populations with high rates of coronary heart disease, which demonstrate a J or U shaped relationship between alcohol and risk of total mortality, the lowest risk for total mortality is found to occur at 10 g/day (one drink) for men and somewhat less for women, a level lower than that found in chapter 2.

Part I of the thesis concludes that alcohol is implicated in a very wide variety of health-related problems. Thus, as general practice involves the treatment of many common physical and mental conditions, their causes in the use of alcohol need to be addressed.

PART II THE EFFECTIVENESS OF GENERAL PRACTICE IN REDUCING THE RISK OF ALCOHOL

In the 1970s and 1980s, there were increasing calls for the involvement of general practice in the management of alcohol use disorders. Whilst the evidence base for the effectiveness of general practitioners in smoking cessation was growing, in the late 1980s there had been only two published studies investigating the effectiveness of general practitioners' advice in reducing heavy drinking, one which demonstrated a treatment effect and one which failed to detect an effect, probably due to insufficient power.

Chapter 4 reports on a randomized controlled trial designed to test the effectiveness of general practitioners' advice to heavy drinking men and women. The trial, which was published as two papers, one in 1990 and one in 1992, finds a significant treatment effect for heavy drinking men, but not for heavy drinking women.

Chapter 5 updates chapter 4 by describing the findings of the major reviews and meta-analyses that have been published during the ten years since 1992. The effectiveness of brief interventions for non-treatment seeking populations in general practice settings is confirmed. There is at least a 10% to 16% reduction in alcohol consumption of intervention groups compared with control groups, at least in the short term. It appears that brief interventions are equally effective for both men and women and more effective for less severe drinking problems. Although the evidence base is limited, it would appear that brief interventions based in primary health care are highly cost effective. Motivational interviewing has been proposed as an effective treatment intervention; however, there is little research evidence to show that it is any more effective compared with other intervention approaches.

The reviews give very little information about predictors of effective treatment. The optimal length and associated contents of brief interventions are not fully answered. Five to ten minutes of advice is effective, but could somewhat longer interventions be even more effective? If so, to what types of at risk drinkers should they be offered and who should offer them? It has been suggested that simple advice works best for drinkers who have experienced a recent alcohol-related problem, while brief counselling works better for those who do not have a recent problem.

The very large project MATCH is described. The project had been set up to find evidence for increased efficacy when patients were matched for different types of treatment; in general, none was found.

Reviews suggest that pharmacotherapies could be promising for the management of alcohol use disorders, although they have been little used and studied in primary health care. Their appropriateness for use in general practice remains questionable.

Part II of the thesis concludes that enough is known to guide practitioners in the implementation of screening and brief intervention programmes. The AUDIT appears to be the best screening instrument to identify hazardous and harmful alcohol consumption in primary care because of its high reliability, sensitivity and specificity. The three essential elements of brief counselling are described as the giving of brief advice, the assessment and tailoring of the advice to stages of change and the provision of follow-up.

PART III THE ATTITUDES OF GENERAL PRACTICE TO REDUCING THE RISK OF ALCOHOL

Chapter 6 begins by describing the Maudsley Alcohol Project which was set up in England in the 1970s to address the task of engaging primary health care providers in the management of the harm done by alcohol. The project, which has been very influential in the lines of research conducted in this thesis, found that general practitioners failed to recognize and respond to drinking problems because they felt anxieties about their role adequacy through not having the information and skills necessary to recognize and respond to drinkers; anxieties about their role legitimacy through being uncertain as to whether or how far drinking problems came within their responsibilities; and anxieties about support in their role through having nowhere to turn for help and advice when they were unsure how to or whether to respond. Primary health care providers who experienced anxiety about these areas were defined on the basis of their responses to the Alcohol and Alcohol Problems Perception Questionnaire as role insecure. Role security measures role adequacy, for example "*I feel I can appropriately advise my patients about drinking and its effects";* and role legitimacy, for example, "*I feel I have the right to ask patients questions about their drinking when* necessary". Role insecurity is expressed at the emotional level as therapeutic commitment which measures motivation, for example "*pessimism is the most realistic attitude to take toward drinkers"*; task specific self-esteem, for example "*all in all I am inclined to feel I am a failure with drinkers"*; and work satisfaction, for example "*in general, it is rewarding to work with drinkers"*.

Chapter 6, noting that the original Alcohol and Alcohol Problems Perception Questionnaire was a lengthy instrument, develops a shortened version of the alcohol and alcohol problems perception questionnaire (the SAAPPQ) a quick yet meaningful measure of general practitioners' attitudes to working with drinkers, first published in 1987.

Chapter 7 analyzes data from nine countries of a World Health Organization collaborative study on brief interventions for hazardous and harmful alcohol use that administered the shortened version of the scale. The findings confirm the conclusions of the Maudsley Alcohol Pilot Project. General practitioners who managed a greater number of patients for alcohol problems had received more education on alcohol (OR=1.5; 95%CI, 1.3-1.7), perceived that they were working in a supportive environment (OR=1.6; 95%CI, 1.4-1.9) and expressed higher role security (OR=2.0; 95%CI, 1.5-2.5) and therapeutic commitment (OR=1.4; 95%CI, 1.1-1.7). In turn, general practitioners who felt more secure in their role and who were more therapeutically committed had received more education on alcohol and perceived that they were working in a more supportive environment. The findings, which are present across the nine countries with differing health care systems, suggest that both education and training and the creation of a supportive work environment to ensure role security and therapeutic commitment need to be provided for primary health care to fulfil its full potential.

Part III of the thesis concludes by noting that a supportive work environment is one in which general practitioners regard screening and counselling materials, training in counselling and help in dealing with difficult situations as being available. General

practice could be supported with on-site health professionals, for example facilitators, who could act as role models, coaches and colleagues in shared care arrangements for dealing with more difficult areas of care in the management of alcohol problems.

PART IV INVOLVING GENERAL PRACTICE IN REDUCING THE RISK OF ALCOHOL

Although there has been a considerable development in the knowledge of how to increase the involvement of primary health care providers in clinical preventive medicine, the extent to which these interventions apply to the specific and special situation of the management of alcohol use disorders, which general practitioners find difficult, was not known.

Chapter 8 is a meta-analysis of strategies to engage general practitioners in the management of alcohol use disorders. The chapter is based on the methodology of the Effective Practice and Organisation of Care Group of the Cochrane Collaboration. A synthesis of the results of twelve studies find that professional and organizational based interventions increased the involvement of general practitioners in delivering screening and brief interventions by between 8% and 18%, when compared with usual practice or a minimal intervention. Promising programmes were those that had a specific focus on alcohol, and those that were multifaceted. The findings were similar to other areas of preventive medicine, including the management of tobacco use disorders, where strategies to engage general practitioners have also been found to be effective for both providers' screening activities and patients' quit rates.

Since only twelve studies of sufficient methodological quality were identified in the review, none of which provided outcomes of patients' alcohol consumption, chapter 8 stresses the urgent need for high quality studies that include patient outcome measures, such as drinking behaviour or alcohol related harm.

Chapter 9 analyses data from four countries of a World Health Organization collaborative study that undertook a randomized controlled trial to evaluate the effectiveness of training and support on the use of a screening and brief intervention program for hazardous and harmful alcohol consumption. Although practice based training and support were found to be effective in increasing general practitioners screening (OR=2.2; 95%CI, 1.3-3.1) and brief intervention (OR=2.8; 95%CI, 1.6-4.0) rates, the impact of the support was only effective for general practitioners who were secure in their role and therapeutically committed. Role security and therapeutic commitment were found to deteriorate over the course of the study. Providing support did not improve subsequent role security and therapeutic commitment. For those who were already insecure in their role and therapeutically uncommitted, support actually made role security and therapeutic commitment worse.

Part IV of the thesis concludes that programmes can increase the involvement of general practice in the management of alcohol use disorders, but notes that there is no simple solution. If the attitudes of the general practitioners are not taken into account, if intervention programs are not specially customised for general practitioners, if understanding of the management of alcohol problems is not reframed and if strategic alliances between those supporting widespread implementation are not built, it is unlikely that the implementation will be successful.

CONCLUSIONS

The work presented in this thesis has spanned fifteen years of interrupted research in the fields of primary health care, public health and alcohol. What can be concluded?

First, the risk of alcohol is not inconsiderable, occurring at doses a little over one drink a day, affecting a very wide range of conditions and contributing to over 9% of the disease burden in high income countries. Although the evidence base can be extended for social harms and for different population groups, alcohol's contribution to the many common physical and mental conditions seen in general practice needs to be addressed. The basic message for the use of alcohol is 'less is better', supported by policies that reduce the harm done by alcohol with resources commensurate in size with alcohol's contribution to the burden of disability.

Second, general practice can be effective in reducing the alcohol consumption and the harm done by alcohol by between 10% and 16% above that of control groups. Although improvements in effectiveness need to be identified, enough is known already to guide practitioners in the implementation of screening and brief intervention programmes. Health care systems need to ensure that such treatments are fully integrated within normal clinical care and reimbursed.

Third, general practitioners' attitudes towards working with alcohol use disorders have an important impact on their behaviour. General practitioners' education and training on alcohol needs to address their attitudes and needs to focus on strengthening their role security and therapeutic commitment. There may be merit in reframing alcohol use disorders to be understood as clinical disorders for which there is effective and cost effective behavioural treatment.

Fourth, it is possible to increase the involvement of general practitioners in delivering screening and brief intervention programmes by between 8% and 18% above that of control groups, which, if replicated at the societal level, could have a huge public health impact. Although there is a need for more high quality studies on the engagement of general practitioners in the management of alcohol problems that include patient outcome measures, programmes to change general practitioners' behaviour that are alcohol specific and employ a number of targeted professionally and organizationally based strategies that deal with the attitudes and concerns of general practitioners need to be widely implemented.

Alcohol and general practice has been described as a 'difficult business'. It is a difficult business for the general practitioner; it is a difficult business for the researcher; it is a difficult business for public health. Hopefully, the work reported in this thesis has gone a little way to help make it easier for all three.

SAMENVATTING*

DE RISICO'S VAN ALCOHOL
WAT HUISARTSGENEESKUNDE KAN DOEN

INLEIDING

Hoofdstuk 1 begint met de constatering dat het gebruik van alcohol tegenstrijdigheden met zich meebrengt. Vervolgens wordt verwezen naar historische studies die laten zien dat onze voorouders werden blootgesteld aan kleine hoeveelheden alcohol door het eten van fruit, een bron van gefermenteerde alcohol en een hoofdbestanddeel van het dagelijkse eetpatroon. In oude beschavingen werd alcohol vervaardigd uit een verscheidenheid aan natuurlijke producten die lokaal voorhanden waren. De wereldhandel en economische factoren bepaalden voornamelijk het drinkpatroon waar het alcohol betreft.

In de hedendaagse maatschappij gebruikt minder dan de helft (49%) van de volwassen populatie alcohol. Een klein percentage consumenten neemt het grootste deel van de totale alcoholconsumptie voor zijn rekening. Alcohol veroorzaakt zowel genot als leed, waarbij de genotbeleving grotendeels door verwachtingspatronen wordt bepaald. Het leed is omvangrijk: 25% van de Europese mannen en 10% van de Europese vrouwen consumeren dusdanig veel alcohol dat het gevaar voor hun gezondheid oplevert en schade toebrengt; bij 10-30% van de gelegenheden waarbij wordt gedronken, wordt minimaal 60 gram alcohol ingenomen; en 3 tot 5% van alle volwassenen zijn verslaafd aan alcohol. Over het algemeen genomen veroorzaakte (overmatig) alcoholgebruik in 2000 9% van de totale ziektelast in de welvarende landen, (gunstige effecten van alcohol zijn hierbij verdisconteerd). Tot aan de 19e eeuw werden dronkenschap en alcoholmisbruik beoordeeld op basis van morele attitudes en werden als zondig of misdadig gezien. De reactie van de openbare gezondheidszorg op overmatig alcoholgebruik vind zijn oorsprong in de geheelonthoudersbeweging die in de 19e en het begin van de 20ste eeuw ontstond. Tegenwoordig is het alcoholbeleid voornamelijk gebaseerd op prijsmaatregelen, zo als het heffen van accijns; en andere maatregelen, zoals het beperken van reclame voor alcohol; en op de behandeling van aandoeningen ten gevolge van alcohol. Al deze maatregelen zijn effectief in het beperken van het brede scala aan schadelijke gevolgen van alcohol.

Binnen de gezondheidszorg wordt aan de huisartsgeneeskunde een rol toebedeeld bij het implementeren van screenings- en korte interventieprogramma's voor het verminderen van de schadelijke gevolgen van (overmatig) alcoholgebruik. Huisartsen vinden het behandelen van alcoholgerelateerde aandoeningen echter zowel technisch als emotioneel gezien moeilijk. De meest genoemde redenen hiervoor zijn: de behandeling van alcoholproblemen is een gezondheidsaspect dat niet thuishoort in de eerstelijnszorg; er is onvoldoende bewijs voor de effectiviteit van interventies; de arts-

* Translated from the English by J.F. Meulenbroek and edited by Ton Drenthen, Trudy Prins and Michel Wensing

patiëntrelatie wordt negatief beïnvloedt omdat een persoonlijke aangelegenheid is die gevoelig ligt hetgeen tot uitdrukking komt in een gebrek aan therapeutische betrokkenheid; ontoereikende scholing en ondersteuning.

Hoofdstuk 1 wordt afgesloten met een overzicht van de vier belangrijkste onderzoeksvragen uit dit proefschrift. Deze hebben alle betrekking hebben op de overwegingen die huisartsen noemen: 1) Wat zijn de risico's van alcohol voor de gezondheid? 2) Kunnen korte interventies in de huisartsenpraktijk de nadelige gevolgen van alcohol verminderen? 3) Welke attitudes hebben huisartsen ten aanzien van het reduceren van de nadelige gevolgen van alcoholgebruik? 4) Hoe kan de rol van de huisartsenzorg in het terugdringen van de alcoholproblematiek het best worden vergroot?

DEEL I DE RISICO'S VAN ALCOHOL

Hoewel de relatie tussen alcoholconsumptie en een groot scala aan schadelijke gevolgen al lange tijd bekend was, was er aan het begin van de jaren negentig van de vorige eeuw nog maar weinig gepubliceerd over de aard en de vorm van de relatie tussen het gebruik van en de schade door alcohol.

Hoofdstuk 2 bevat een systematische review van 156 gepubliceerde artikelen over het risico op lichamelijke klachten ten gevolge van het gebruik van alcohol. Dit overzicht, waarin een aantal risico curves wordt gepresenteerd, werd in 1993 gepubliceerd en in 1995 geactualiseerd. Vanwege variatie in methodologie was het niet mogelijk om het individuele risico te bepalen voor alle typen gezondheidsproblemen bij uiteenlopende niveau's van alcoholconsumptie. Desalniettemin wordt in het hoofdstuk geconcludeerd dat bij een gerapporteerde alcoholconsumptie van meer dan 20-30 gram per dag de risico's voor elk individu waarschijnlijk cumulatief zijn.

Hoofdstuk 3 is een aanvulling op Hoofdstuk 2 en beschrijft de bevindingen van de belangrijkste overzichtsartikelen en meta-analyses die tussen 1993 en 2003 zijn gepubliceerd. De synthese van kwalitatief hoogwaardige onderzoeken levert sterker bewijs voor de relatie tussen alcoholconsumptie en gezondheidsproblemen op zowel individueel als populatieniveau. Zo wordt bevestigd dat alcoholgebruik een risicofactor is voor borstkanker bij vrouwen die niet kan worden verklaard door de invloed van andere bekende risicofactoren. Er wordt geschat dat in welvarende landen de cumulatieve incidentie van borstkanker bij een leeftijd van 80 jaar lineair toeneemt van 88 per 1000 vrouwen bij niet-drinkers tot 133 per 1000 vrouwen die dagelijks gemiddeld zes alcoholische consumpties gebruiken.

Een systematische overzichtsstudie liet een duidelijke relatie zien tussen recent en chronisch gebruik van alcohol en de kans op beroerte, zonder dat er duidelijk bewijs voor een preventief effect voor een ischemisch infarct wordt gevonden. De inname van een grote hoeveelheid alcohol binnen een kort tijdsbestek verhoogt de kans op myocard infarcten en plotse hartstilstand. Hoewel meta-analyses bevestigen dat alcohol het risico van hart- en vaatziekten kan reduceren, is de relatie niet consistent over alle studies, en neemt het risico van hart- en vaatziekten toe bij een hogere alcoholconsumptie, en blijft de rol van andere risicofactoren onopgehelderd. De mate

van risicoreductie op hart- en vaatziekten (20%) blijkt kleiner en treedt op bij een lagere alcoholinname (20 gram alcohol per dag) dan werd geconstateerd in Hoofdstuk 2.

Diverse studies hebben, naast de hoeveelheid geconsumeerde alcohol, nadrukkelijk gewezen op de rol van patronen in het drankgebruik voor het risico van alcoholgerelateerde bedoelde en onbedoelde schade, en voor de maatschappelijke gevolgen van alcoholgebruik.

In populaties met een hoge incidentie van hart- en vaatziekten, die een J- of U-vormig verband tussen alcohol en het risico van totale mortaliteit laten zien, is de kans op sterfte het laagst bij 10 gr. alcohol per dag voor mannen en iets minder voor vrouwen; dit is lager dan werd gevonden in Hoofstuk 2. Beleid waardoor de consumptie van alcohol zakt, blijkt te resulteren in een netto reductie van de schadelijke gevolgen.

Deel I van dit proefschrift eindigt met de conclusie dat alcoholgebruik een rol speelt bij een uitgebreid scala aan gezondheidsproblemen. Aangezien in de huisartsenpraktijk vele algemeen voorkomende somatische en psychische klachten worden behandeld, verdienen die gevallen waarbij alcohol een van de oorzaken is speciale aandacht.

DEEL II DE EFFECTIVITEIT VAN DE HUISARTSENPRAKTIJK IN HET REDUCEREN VAN DE SCHADELIJKE GEVOLGEN VAN ALCOHOL

In de periode tussen 1970 en 1990 werd de roep om de huisartsenpraktijk te betrekken bij de aanpak van alcoholgerelateerde aandoeningen steeds sterker. Terwijl er steeds meer bewijs kwam dat de hulp van huisartsen bij het stoppen met roken effectief was, waren er aan het eind van jaren ’80 nog maar twee studies verschenen die de effectiviteit van de huisartsenpraktijk bij het verminderen van overmatig gebruik onderzochten. Een van deze studies vond een behandelingseffect en in de andere studie werd geen effect gevonden, waarschijnlijk als gevolg van onvoldoende power.

Hoofdstuk 4 beschrijft een gerandomiseerd, gecontroleerd onderzoek waarin de effectiviteit van het advies van huisartsen aan zwaar drinkende mannelijke en vrouwelijke patiëntenwerd nagegaan. Het experiment, gepubliceerd in twee artikelen in respectievelijk 1990 en 1992, liet een significant effect zien bij de mannelijke zware drinkers, maar niet bij de zwaar drinkende vrouwen. Het gebrek aan bewijs voor een effect bij vrouwen kan mogelijk worden verklaard door vervuiling van de controlegroep door informele interventies.

Hoofdstuk 5 is een aanvulling op Hoofdstuk 4 met een beschrijving van de bevindingen van de belangrijkste overzichtsartikelen en meta-analyses die tussen 1992 en 2003 zijn verschenen. De effectiviteit van in de huisartsenpraktijk aangeboden korte interventies voor populaties die zelf geen behandeling hadden gezocht, werd bevestigd. In vergelijking met controlegroepen vermindert in de interventiegroepen de hoeveelheid geconsumeerde alcohol met minimaal 10 tot 16% en nemen de alcoholgerelateerde problemen met 9 tot 15% af, in ieder geval op de korte termijn. Korte interventies blijken even werkzaam voor mannen als vrouwen en meer effect te sorteren bij minder ernstige alcoholproblemen. Hoewel het bewijs beperkt is, lijken korte interventies binnen de eerstelijnszorg uiterst kosten-effectief.

De overzichtsartikelen geven weinig informatie over factoren die een positief behandeleffect voorspellen. Zo wordt over de optimale lengte en inhoudelijke behandelingscomponenten van korte interventies weinig opheldering verschaft. Voor het geven van advies blijkt vijf tot tien minuten doeltreffend. De vraag is: zouden iets langere interventies nog effectiever zijn? Zo ja, aan welke typen risicodrinkers zouden deze interventies dan dienen te worden aangeboden en wie zou ze moeten uitvoeren? Een gedachte was dat eenvoudig advies het meeste effect heeft bij drinkers die recent een probleem met hun gezondheid hebben ondervonden ten gevolge van overmatig alcoholgebruik, terwijl voor degenen die geen recent probleem hebben korte begeleiding het beste werkt.

Het omvangrijke Noord-Amerikaanse project MATCH wordt beschreven. Het project was opgezet om bewijs te vinden voor een verhoogde werkzaamheid van interventies door het type behandeling af te stemmen op de individuele patiënt. Globaal gezien kon echter geen meerwaarde worden aangetoond.

Motivationele gesprekstherapie ('motivational interviewing') is genoemd als een effectieve behandelingmethode. Er is echter weinig experimenteel bewijs dat deze methode doeltreffender is dan andere interventietechnieken.

Overzichtsartikelen noemen diverse vormen van farmacotherapie als veelbelovende behandelmethoden voor alcoholgerelateerde aandoeningen, al zijn ze slechts beperkt toegepast en enkel bestudeerd binnen de eerstelijnszorg. Er bestaat vooralsnog twijfel over de geschiktheid van dergelijke therapie voor toepassing in de huisartsenpraktijk.

Deel II van dit proefschrift wordt afgesloten met de conclusie dat er voldoende kennis aanwezig is die huisartsen kan ondersteunen bij de implementatie van screenings- en korte interventieprogramma's. Vanwege zijn hoge betrouwbaarheid, sensitiviteit en specificiteit lijkt AUDIT het meest geschikte screeningsinstrument te zijn voor de eerstelijnszorg om risicovol en schadelijk gebruik van alcohol te identificeren. Er worden drie behandelingselementen omschreven die essentieel zijn voor korte interventies: het geven van een beknopt advies, evaluatie van en aanpassing van het advies aan het stadium van verandering en het bieden van follow-up.

DEEL III DE ATTITUDES VAN HUISARTSEN MET BETREKKING TOT HET REDUCEREN VAN DE GEVAREN VAN ALCOHOL

Hoofdstuk 6 begint met een beschrijving van het Maudsley Alcohol Project dat in de jaren zeventig van de vorige eeuw in Engeland werd opgezet met als doel hulpverleners in de eerstelijnszorg te betrekken bij de behandeling van de schade ten gevolge van alcohol. . Dit project, dat zeer bepalend is geweest voor de gevolgde onderzoekslijnen in dit proefschrift, wees uit dat: (1) huisartsen drankproblemen niet wisten te herkennen en er niet op konden inspelen omdat ze zich onzeker voelden over hun capaciteiten ('role adequacy') omdat ze niet beschikten over de benodigde informatie en vaardigheden om probleemdrinkers te herkennen en te behandelen; (2) huisartsen zich zorgen maakten over de legitimiteit van hun rol ('role legitimacy'), omdat ze er niet zeker van waren of en in hoeverre drankploblemen onder hun verantwoordelijkheid vielen; (3) huisartsen bang waren geen ondersteuning te krijgen in

deze context, omdat ze niet wisten tot wie ze zich konden wenden voor hulp en advies over hoe en wanneer ze dienden in te grijpen. Hulpverleners in de eerstelijnszorg die zich ongerust maakten over deze facetten werden op basis van hun antwoorden op de 'Alcohol and Alcohol Problems Perception Questionnaire' (AAPPQ) gekarakteriseerd als 'rol-onzeker' ('role insecure'). 'Rol-zekerheid' ('Role security') omvat 'rol-geschiktheid' ('role adequacy'), bijvoorbeeld "*Ik vind dat ik mijn patiënten naar behoren kan adviseren over drankgebruik en de gevolgen ervan"*, en 'rol-legitimiteit' ('role legitimacy'), bijvoorbeeld "*Ik vind dat ik het recht heb patiënten vragen te stellen over hun drankgebruik als ik dat nodig acht*". Rol-onzekerheid leidt op emotioneel niveau tot 'therapeutische commitment', hetgeen motivatie omvat, bij voorbeeld "*pessimisme is de meest realistische attitude die je ten opzichte van drinkers kunt aannemen"*, 'taak-specifieke zelfwaardering' ('task-specific self-esteem'), bijvoorbeeld "*alles overziend, ben ik geneigd volstrekt tekort te schieten in mijn benadering van drinkers"*, en arbeidssatisfactie ('work satisfaction'), bijvoorbeeld "*over het algemeen is het een dankbare taak met drinkers te werken"*.

In Hoofdstuk 6, dat voor het eerst werd gepubliceerd in 1987, wordt geconstateerd dat de oorspronkelijke AAPPQ een lange vragenlijst was. Er werd een verkorte versie van deze vragenlijst, de SAAPPQ, ontwikkeld, een snel af te nemen en toch adequaat meetinstrument voor de attitudes van huisartsen ten aanzien van het werken met probleemdrinkers. In Hoofstuk 7 worden de gegevens geanalyseerd van een gezamenlijke studie van de World Health Organization waaraan negen landen deelnamen naar korte interventies bij risicovol en schadelijk alcoholgebruik waarin de SAAPPQ werd gebruikt. De bevindingen bevestigen de conclusies van het Maudsley Alcohol Pilot Project. Huisartsen die een groter aantal patiënten met drankproblemen behandelden, hadden meer scholing ontvangen over (overmatig) alcoholgebruik (OR=1.5; 95% CI, 1.3-1.7), vonden dat ze in hun werkomgeving meer ondersteuning kregen (OR=1.6; 95% CI, 1.4-1.9) en scoorden hoger op rol-zekerheid (OR=2.0; 1.5-2.5) en therapeutische commitment (OR=1.4; 95% CI, 1.1-1.7). Ook omgekeerd bleken huisartsen die zich zekerder voelden in hun rol en die een grotere therapeutische betrokkenheid tentoonspreidden, beter geschoold te zijn in alcoholproblematiek en meer steun binnen hun werkomgeving te ervaren. Deze resultaten, die in alle negen landen hetzelfde waren ondanks de verschillen in de gezondheidszorg, suggereren dat zowel educatie en training, als de mogelijkheid van een ondersteunende werkomgeving, voorwaarden voor rolzekerheid en therapeutische betrokkenheid aanwezig dienen te zijn, wil de eerstelijnszorg haar potentieel optimaal kunnen vervullen.

Deel III van dit proefschrift eindigt met de constatering dat volgens huisartsen een ondersteunende werkomgeving inhoudt dat er screenings- en interventiematerialen voorhanden zijn en er training in gesprekstechnieken en hulp bij moeilijke situaties geboden wordt. De huisartsenzorg zou kunnen worden ondersteund door andere hulpverleners, waaronder consulenten, die bij de meer gecompliceerde gevallen kunnen fungeren als rolmodellen, trainers en collega's bij de aanpak van alcoholgerelateerde aandoeningen.

DEEL IV HUISARTSEN BETREKKEN BIJ HET VERMINDEREN VAN DE RISICO'S VAN ALCOHOL

Alhoewel de kennis over de verschillende manieren waarop hulpverleners in de eerstelijnszorg kunnen worden betrokken bij de klinische preventieve geneeskunde aanzienlijk is toegenomen, is er weinig bekend over de mate waarin deze interventies van toepassing zijn op de specifieke en uitzonderlijke situatie van de door huisartsen als moeilijk ondervonden behandeling van alcohol-gerelateerde aandoeningen.

Hoofdstuk 8 is een meta-analyse van strategieën om huisartsen te betrekken bij de behandeling van alcoholgerelateerde aandoeningen. Het hoofdstuk is gebaseerd op de methodologie van de 'Effective Practice and Organisation of Care Group' van de Cochrane Collaboration. Een synthese van de resultaten van twaalf studies laat zien dat professionele en organisatiegerichte interventies de bereidheid van huisartsen om screeningsprogramma's en korte interventies aan te bieden met 8% tot 18% deed toenemen in vergelijking met de normale praktijk of een minimale interventie. Vooral de programma's die speciaal waren gericht op de behandeling van alcoholproblemen en programma's die uit meerdere behandelfacetten bestonden, waren veelbelovend. De bevindingen waren vergelijkbaar met de resultaten uit andere gebieden van de preventieve geneeskunde, zoals de aanpak van aan roken gerelateerde aandoeningen waarbij strategieën om huisartsen te betrekken ook effectief bleken voor zowel de screeningsactiviteiten van de hulpverlener als het aantal patiënten dat met roken stopt.

Het overzichtsartikel bevatte slechts twaalf studies van een voldoende methodologisch niveau, waarbij geen enkele studie gegevens over de mate van alcoholgebruik van de patiënten vermeldde. Daarom wordt in Hoofdstuk 8 de noodzaak aangegeven van gedegen wetenschappelijk onderzoek met uitkomsten op patiëntniveau, zoals drinkgedrag en schade ten gevolge van alcohol.

Hoofdstuk 9 analyseert de resultaten van een door de World Health Organization geïnstigeerde gezamenlijke studie in vier landen waarin doormiddel van een gerandomiseerde, gecontroleerde studie de effectiviteit werd geëvalueerd van scholing en ondersteuning bij het gebruik van een screenings- en korte interventieprogramma gericht op risicovol en schadelijk alcoholgebruik. Hoewel praktijkgerichte scholing en ondersteuning het aantal huisartsen dat screening (OR=2.2; 95%CI, 1.3-3.1) en korte interventies (OR=2.8; 95%CI, 1.6-4.0) aanbood deed toenemen, bleek de invloed van de ondersteuning alleen effectief bij huisartsen die zeker van hun rol waren en voldoende therapeutische betrokkenheid hadden. Zowel rol-zekerheid als therapeutische betrokkenheid bleken gedurende het verloop van de studie af te nemen. Het bieden van ondersteuning had geen invloed of deze twee factoren. Bij degenen die zich al onzeker voelden en wiens therapeutische betrokkenheid laag was, bleek ondersteuning deze attitudes zelfs te verslechteren. Ervaring opgedaan door het veelvuldig aanbieden van screenings- en korte interventieprogramma's, leidde niet tot verhoogde rolzekerheid en therapeutische betrokkenheidt. Bij huisartsen die al onzeker waren, bleek de ervaring in het geven van korte interventies dit alleen maar te versterken.

Deel IV van het proefschrift concludeert dat programma's de betrokkenheid van huisartsen bij het behandelen van alcoholgerelateerde aandoeningen inderdaad kunnen verhogen, maar constateert dat dit niet eenvoudig is te realiseren. Implementatie van

behandelprotocollen kan alleen dan succesvol zijn wanneer de attitudes van huisartsen in ogenschouw worden genomen, interventieprogramma's specifiek op huisartsen worden aangepast, de opvattingen over de aanpak van de alcoholproblematiek worden bijgesteld en er strategische samenwerkingsverbanden voor grootschalige implementatie tot stand worden gebracht.

CONCLUSIES

Het werk dat in dit proefschrift wordt gepresenteerd omvat vijftien jaar onderzoek op het gebied van de eerstelijnszorg, de openbare gezondheidszorg en alcoholgebruik. Wat zijn de conclusies?

Ten eerste blijken de gevaren van alcohol aanzienlijk: er is al sprake van risico's bij het gebruik van weinig meer dan één enkele dagelijkse alcoholische consumptie, en is er een breed scala aan aandoeningen mee gemoeid, waarbij de gevolgen ruim 9% van de totale ziektelast in de welvarende landen bepalen. Hoewel er meer kennis nodig is over de maatschappelijke gevolgen en de effecten in verschillende populaties, verdient de invloed van alcohol op vele somatische en psychische aandoeningen die in de huisartspraktijk worden behandeld, aandacht. De centrale boodschap is duidelijk: minder is beter. Dit devies dient ondersteund te worden door beleid dat erop gericht is de alcohol-gerelateerde schade te beperken, waarbij het budget evenredig zou moeten zijn aan het aandeel dat alcohol in de kosten door arbeidsongeschiktheid heeft.

Ten tweede, huisartsen kunnen de schadelijke gevolgen van (overmatig) alcoholgebruik effectief met 10 tot 16% beperken. Alhoewel er gezocht moet worden naar mogelijkheden die dit effect kunnen vergroten, is er reeds voldoende kennis beschikbaar om huisartsen te helpen bij de implementatie van screenings- en korte interventieprogramma's. De gezondheidszorg dient ervoor zorg te dragen dat dergelijke behandelingen volledig geïntegreerd worden in de reguliere klinische zorg en worden vergoed.

Ten derde blijken de attitudes van huisartsen ten aanzien van het behandelen van alcoholgerelateerde aandoeningen van grote invloed op hun gedrag. Tijdens de opleiding en scholing van huisartsen dienen deze attitudes aan bod te komen, waarbij vooral aandacht dient te worden besteed aan het versterken van hun rolzekerheid en therapeutische betrokkenheid. Het is aan te bevelen alcohol-gerelateerde aandoeningen op te vatten als klinische stoornissen waarvoor doeltreffende en kosteneffectieve gedragsmatige behandelingen bestaan.

Ten vierde is het mogelijk gebleken de bereidheid van huisartsen om screenings- en korte interventieprogramma's aan te bieden met 8 tot 18% te verhogen. Wanneer dit op grotere schaal kan worden doorgevoerd, zal dit een groot effect hebben op de algemene gezondheid. Er is behoefte aan meer gedegen wetenschappelijk onderzoek naar de betrokkenheid van huisartsen bij de behandeling van alcoholproblemen dat uitkomsten op patiëntniveau bevat. Desalniettemin kan al worden aanbevolen om specifiek op alcoholproblematiek gerichte programma's te implementeren, die het gedrag van huisartsen veranderen en gebruik maken van verschillende doelgerichte, professionele en organisatiegerichte strategieën om de attitudes en zorgen van huisartsen te veranderen en hun problemen op te lossen.

De relatie tussen alcoholproblemen en huisartsgeneeskunde wordt wel omschreven als een ‘probleemgebied’: problematisch voor zowel de huisarts, de onderzoeker, als voor de openbare gezondheidszorg. Hopelijk draagt dit proefschrift er aan bij om het voor deze drie partijen eenvoudiger te maken.

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About the author

Peter Anderson holds an MA in physiological sciences, an MD (BM BCH) with the University of Oxford and an MSc in public health medicine with the London School of Hygiene and Tropical Medicine. He is a specialist in general practice (MRCGP) and a specialist in public health medicine (MFPHM). He was a general practitioner in the University's academic general practice and an honorary consultant in public health medicine with Oxfordshire Health Authority. As clinical reader in public health at the University of Oxford he became the first director of the National Unit for Health Promotion in Primary Health Care in England. He was a co-author of the influential reports of the Royal College of General Practitioners, 'Alcohol - a Balanced View' and of the Faculty of Public Health Medicine 'Alcohol and the Public Health'.

From 1992, he was a Regional Adviser for the European Office of the World Health Organization, initially with the European Alcohol Action Plan and from 1997, with the Tobacco Free Initiative Europe. Whilst Regional Adviser for the European Alcohol Action Plan, he set up and managed the Phase III and Phase IV WHO collaborative projects implementing brief interventions for hazardous and harmful alcohol consumption in primary health care, frequently referred to in this thesis. He was responsible for the 1995 Paris ministerial conference, 'Health, Society and Alcohol' and a co-author of the landmark publication, 'Alcohol Policy and the Public Good'. From 1999 to 2000, he was the acting Director of the Department of Health Promotion and Disease Prevention. During this time he was an adviser to both the European Commission and the World Bank.

In August 2000, he left his post with the World Health Organization to work as an independent consultant and scientist in public health and primary care. He holds honorary appointments at the Universities of Oxford in England and Nijmegen in the Netherlands. His clients include the World Health Organization, the Open Society Institute and the Health Development Agency of England. He is adviser to the Ministry of Health, Welfare and Sports of the Netherlands for its Partnership Project to Reduce Tobacco Dependence, (Partnership Stop Met Roken) and to the Ministry of Health of Catalonia for its European Commission funded project, integrating brief interventions for hazardous and harmful alcohol consumption in primary health care. He is policy adviser to Eurocare, the European non-governmental organization on alcohol policy, and through this is a regular adviser to the European Commission.

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